The Builder.

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The Trade Union Congress.

WHAT is the principal lesson to be learnt from the Trade Union Congress of 1906? We submit that the answer to the above question is undoubtedly the fact that trade unions can no longer be considered the associations which they were when legislative protection was given them in 1871 and 1876, but that they are socialistic combinations. The definition of a trade union in the Act of 1871, as slightly amended by the Act of 1876, is as follows:—"The term trade union means any combination, whether temporary or permanent, for regulating the relations between workmen or masters or between workmen and workmen or between masters and masters, or for imposing restrictive conditions on the conduct of any trade or business, whether such combination would or would not, if the principal Act had not been passed, have been deemed to have been an unlawful combination by reason of some one or more of its purposes being in restraint of trade." In the light of the above definition let us consider some of the subjects debated at the Congress. The President in his address is reported to have said: "The feeding of the children, housing of the people, old age pensions, land reform, and other questions of national importance demanded early attention"; and resolutions were submitted on the subjects of old age pensions, international arbitration and militarism, nationalisation of railways, canals and minerals, municipal banking, and the abolition of the aldermanic bench. It is most important to observe that sect. 4 of the Trades Disputes Bill, as amended by the Government, which renders it impossible to recover damages against any trade union for tortious acts in any court of justice is perfectly general in its terms, and not limited to the acts of trade unions in relation to trade disputes. The clause as drafted stands at present: "An action against a trade union whether of workmen or masters or against any members or officials thereof on behalf of themselves and all other members of the trade union for the recovery of damages in respect of any tortious act alleged to have been committed by or on behalf of the trade union, shall not be entertained by any court : : ." In the original Bill as drafted by the Government the section was limited to tortious acts committed in furtherance of trade disputes, but now it would appear that any tortious act committed by a trade union, whether directed to attain the abolition of the army, the nationalisation of railways, or even to deprive an alderman of his seat on the bench, is to give no remedy in our courts of law. The vast majority of the nation who are not socialists will, at any rate, be glad of some assurance from the Government on this point.

The attitude of the Congress towards such subjects is also worthy of note. The resolution on old age pensions affords an example; the resolution was that all citizens, men and women, were on attaining the age of 60 to be entitled to a pension of at least five shillings a week, the entire cost of the scheme to be contributed by means of Imperial taxation; the resolution suggested no encouragement to thrift or of contributions from the "citizens" during their active life: The Congress advocated international arbitration, but on matters more within its province negatived by 958,000 votes to 541,000 a resolution advocating the principle of voluntary and compulsory arbitration and conciliation in trade disputes.

The Congress, of course, expressed some anxiety as to the fate of the Trades Disputes Bill, but by a curious coincidence the same issue of the *Times* which contained the resolution on this subject contained a report of the proceedings in the South Wales coalfields in connexion with the refusal of certain miners to join the federation. According to that report windows of the houses of non-union men were broken, one non-union man was thrown into white lime, another covered with soot, others attired in white shirts over their clothing were compelled to march at the head of hostile processions, whilst some were divested of their clothes and their backs were blackleaded, all of which acts were, no doubt, excellent examples of "peaceful persuasion." At any rate, it appears to have been successful persuasion. The report of the Free Labour Association, with its large membership, also comes at an opportune time to

remind the community that all working men are not appreciative of trade union methods.

Other resolutions submitted to the Congress related to such matters as the exemption of household goods to the value of 20*l.* from seizure for rent, and the necessity for legislation rendering eviction during strikes and lockouts illegal, reform of the land laws, compulsory state insurance, and minimum rates of wages.

In all this mass of verbiage it must be borne in mind that the trade unions have in their proper sphere accomplished good work which we should be the last to depreciate, and allowance must be made for a certain amount of natural exhilaration over the concessions wrung from the present Parliament; but it is for their leaders to judge whether their real usefulness and their popularity with the public is likely to be forwarded by the promulgation of extreme views expressed in a most intolerant spirit on matters outside their proper sphere, on the occasions of their annual meetings. Conciliation has done much of late years in improving the feeling existing between capital and labour, and arbitration has avoided much productive labour passing into the hands of our trade competitors. Since the decision of the Taff Vale case strikes and lockouts have diminished, whilst the conditions of the working classes have continued to improve. The trade unions when seeking to obtain an alteration in the law as to the liability of their funds have often given the public assurances that terrorism is not their object, but that they favour conciliatory measures. The delegates to the Congress may know that the resolutions passed on this subject mean nothing, but are only part of a system of "bluff," but the general public may not be so discriminating, and will certainly question the doctrine of the Trades Disputes Bill, that a trade union can do no wrong.

ST. PETER-ON-THE-WALL, BRADWELL-ON-SEA.

ALTHOUGH so little known, there is no place on the east coast of England that can surpass in varied historical interest or in early Christian reminiscences the particular site which we are about to consider.

At the time of the Roman occupation the chief fort of our conquerors on the flat eastern shores north of the Thames was that which was built on the southern point of the wide estuary leading up to Maldon. This was the fortress of Othona. Around this Roman fortress there grew up during the four centuries of their occupation a considerable city. The Anglo-Saxon invading hordes, in the earlier days of their landing, doubtless destroyed, as was their wont, the chief features of the fort and city.

After St. Augustine, in 604, appointed Mellitus to be Bishop of London, and missionary to the pagans of the kingdom of the East Saxons (Essex), of which London was then a capital, heathen influence eventually prevailed, and the bishop, after a few years, returned to Canterbury. In the year 653 there was a second planting of Christianity amongst these East Saxons. Sigebert the Good was converted, and, on seeking Christian teachers, Cedd, the brother of St. Chad, was sent with another priest to preach and baptise in Essex. Their success was so great that Cedd was speedily consecrated Bishop of the East Saxons. There were two centres of his authority, as named by Bede—the one at Tilbury at the entrance to the Thames, and the other, which was the first and more important of Cedd's ecclesiastical residences, at Ythancestir, at the entrance of the Blackwater. At Tilbury a monastic establishment for his converts was established by Cedd, but at Ythancestir, where there was then a considerable population, the bishop gathered round him a number of priests and deacons to form the nucleus of a native church. Ythancestir was on the site of the old Roman fortress of Othona.

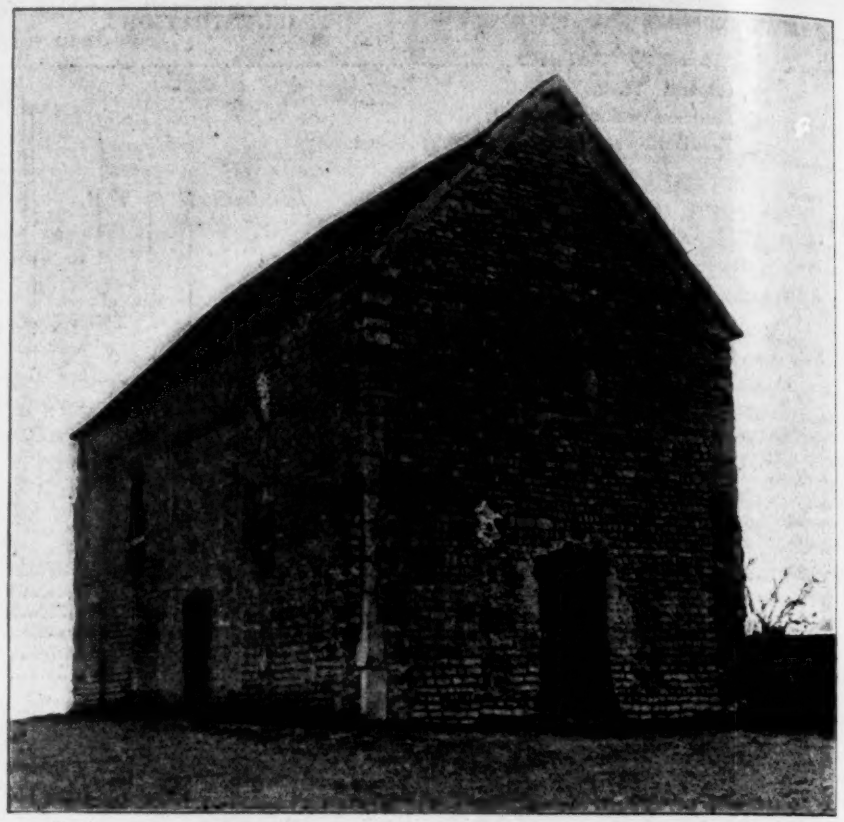

Fig. 1. Chapel of St. Peter-on-the-Wall: North-west View.

It is a matter of almost supreme interest to feel assured that a visitor to the somewhat dreary north-east corner of the Hundred of Dengey, Essex, can now see standing on the verge of the sea, facing St. Peter's Sands, a tall barn-like building, by far the greater part of the fabric of which was erected in the VIIth century in the days of St. Cedd.

In the year 1864-5 Mr. Parker, the owner of this corner of Essex, spent much money and time in the intelligent investigation of the great Roman camp of Othona. Mr. C. Roach Smith described the unearthing of considerable portions of its walls, which were found to be 14 ft. thick, in the *Gentleman's Magazine* of that year, giving a woodcut of an exposed part of the wall surface formed of small, squared stones bonded at intervals by tiles. A fuller account of this fort and other ones on the *Littus Saxonicum* was given by Mr. Lewin in the *Archæologia* (Vol. XLI.) of 1867, accompanied by plans. From the discoveries then made, and which can now be distinctly traced, it became apparent that Cedd had built the first Christian church or small minster of this kingdom right across the outer west wall of the levelled fortress, doubtless with the idea of securing a firm foundation for a considerable part of the fabric. The fortress or camp faced due east, just round the point towards the sea, and experts are satisfied that the ancient church or chapel was built in the exact centre of the west wall where the *porta prætoria*, or chief entrance, stood. This Christian building, locally known as "the old chapel," and more correctly described as St. Peter-on-the-Wall, was known in mediæval days as *Capella de la Val*, or *St. Peter-ad-Murum*.

It would almost certainly be sacked, and the interior fittings probably burnt when the Danes made their various raids up the Blackwater in the IXth and Xth centuries. When the building came to be again used for Christan worship in pre-Norman days, population had probably much shifted. The little church of such early sacred associations would still further lose its importance in Norman times, and hence it came about in the establishment of parishes that St. Peter-on-the-Wall became a mere chapelry of the parish of Bradwell-on-Sea. Some seven miles due south of this old chapel is the thriving large village or small town of Southminster, whose very name implies an early Christian settlement. Southminster, therefore, was in all probability the second Christian mission settlement of some importance in this district; and its name originated through the site being some miles to the south of Ythancestir, where the first or old minster stood.

The episcopal registers at St. Paul's Cathedral have an interesting XVth century reference to this building. In

Bishop Gilbert's register (1436-48) there is the record of an inquisition held here in 1442, when the jury found that the chapel of St. Peter-ad-Murum was dependent on Bradwell, and a chapel of ease to it, and that the rector found a priest to say mass there on Sundays, Wednesdays, and Fridays. They describe it as having a chancel, nave, and small tower with two bells, and state that after a recent fire the chancel had been repaired by the rector and the nave by the parishioners. When it was founded, and by whom, it is not surprising to find that they knew not.

The building as it now stands consists merely of the small but substantial and well-proportioned nave, but with traces of the eastern apse and western porch. The foundations of the great Roman wall to the fortress pass right under the building, about its centre, so that the east end with its former apse stood within the fort, and the west end with the entrance porch on the land side outside the fort. It may here be mentioned that a fair amount of the foundations of the fort wall are apparent on the south side of the chapel within a fold-yard; they might possibly be mistaken by any one unacquainted with the pre-Christian history of the place as parts of the foundations of ecclesiastical buildings presumably connected with the church or chapel.

The exact outer measurements of the fabric as it now stands give a length of 54 ft. 8 in. by 26 ft. 2 in. The thickness of the walls averages 2 ft. 2 in. The height of the walls at the sides and at the spring of the gables of the east and west ends very nearly corresponds to the width of the building, being close upon 25 ft. The building of the groins, or angles, at the west end is most interesting. (See Fig. 1.) Save for a few feet at the top, where Roman tiles and smaller stones are used, these angles are formed from long and heavy blocks of square oölite stone which has obviously come from some older building. At first sight the north-west angle has somewhat the appearance of "long-and-short work" of later Saxon date; but this is not the case with the other angle, and is merely an accidental effect. The reason why it is quite certain that these angle-stones, as well as the jamb-stones of some of the windows, have been previously used is that they are chiselled in several places with clean-cut mortises, which are quite useless in their present position. The fact is that these stones must have come from the great Roman gateway that stood in this place. The bottom stone of the north-west angle is 39 in. long, and its two faces are respectively 9 in. and 15 in.; the next stone above it has a length of 45 in.; the higher ones are a good deal smaller.

The whole of the fabric of the building, with the exception of an obviously later roof, as well as the east gable over the former apse and the filling-up of some of the window-openings, shows a re-use of Roman materials. A large number of small, squared stones, set in wide-jointed mortar, as well as a considerable supply of tiles, were used in building up this place for Christian worship. The tiles, besides being worked up in some of the upper courses, are exclusively and ingeniously used for turning the heads of the arches of the window at the west end, and of the great arch into the apse; they were doubtless equally used in the west doorway and in the side windows before alteration. The longest of these Roman tiles are 16 in. in length, and their thickness varies from 1¼ in. to 1½ in.

In the centre of the west end there is a doorway 4 ft. 10 in. across, which has been built up with modern brick; it has been about 10 ft. high when perfect. About 2 ft. each side of the door openings are the remnants of the projecting walls of the original porch. When excavations were going on here in 1864-5 the foundations of the side walls of this porch were uncovered to a height of 2 ft., but these have now disappeared. This porch at some subsequent period was considerably raised, and carried the two bells which are mentioned in the report of 1442. It is clear that the porch was originally of a single stage, for the base of the west window is about 6 ft. above the top of the doorway. This round-headed window, with its tiled arch, is about 4 ft. 6 in. wide internally and 3 ft. wide at the opening.

In each of the side walls there have been two windows at about the same height and of the same proportions as the one in the west gable; but they have lost their arches and have flat wooden lintels, and are now filled up in various ways. On the north side a space of 14 ft. 8 in. in width is of later large rubble masonry. This is the comparatively modern filling-up of a square excrescence which was probably added to the building in Elizabethan times. The foundations of this adjunct still remain, and in 1865 several of the older inhabitants remembered it standing. A space somewhat similar to this on the south side has been mutilated by the insertion of great waggon doorways since the time the building was used for a barn. On this side, at the east end, now concealed by a modern wooden hovel, are the jambs of a small, blocked-up priest's doorway.

The east end of the chapel is especially interesting. The remains of most of the great archway into the former apse, as well as the jambs, formed entirely of courses of Roman tiles, are quite obvious. (Fig. 2.) The east gable above the apse has been filled up with late mediæval brick-work, which probably represents the repairs done by the rector after the fire which is recorded in the already cited 1442 entry. From the interior it becomes obvious that the entrance into the apse or sanctuary from the nave was through triple arches of Roman tiles.

We have left to the last the most noteworthy and remarkable feature of this building, and it is the more important to consider as it has lead several able men to form wrong estimates as to its general age. The age of St. Peter-on-the-Wall has been variously given as (1) Roman; (2) early Saxon; (3) late Saxon; (4) Norman; and (5) Early English. As to the first of these, the idea that was once held as to this chapel being a Christianised small Roman basilica, such a supposition is absolutely untenable without any knowledge of the foundations upon which it is built; for, as has been well pointed out, the scheme of erecting such an exposed and undefended building on the verge of a highly-important fortress would be "a wretched engineering mistake," of which the Romans would certainly not be guilty. That which has led others astray in estimating the date is the presence of the remains of projecting buttresses at each side of the west angles of the church and also against the north and south walls. (Fig. 3.) These buttresses, which attain to a height of only about 14 ft., might, when carelessly observed, be considered to be later additions; but minute observation puts it beyond gainsaying that they are of the same Roman material and of the same date as the fabric itself. Now, buttresses of this nature are entirely unknown in Norman buildings, and, being original, it is quite impossible

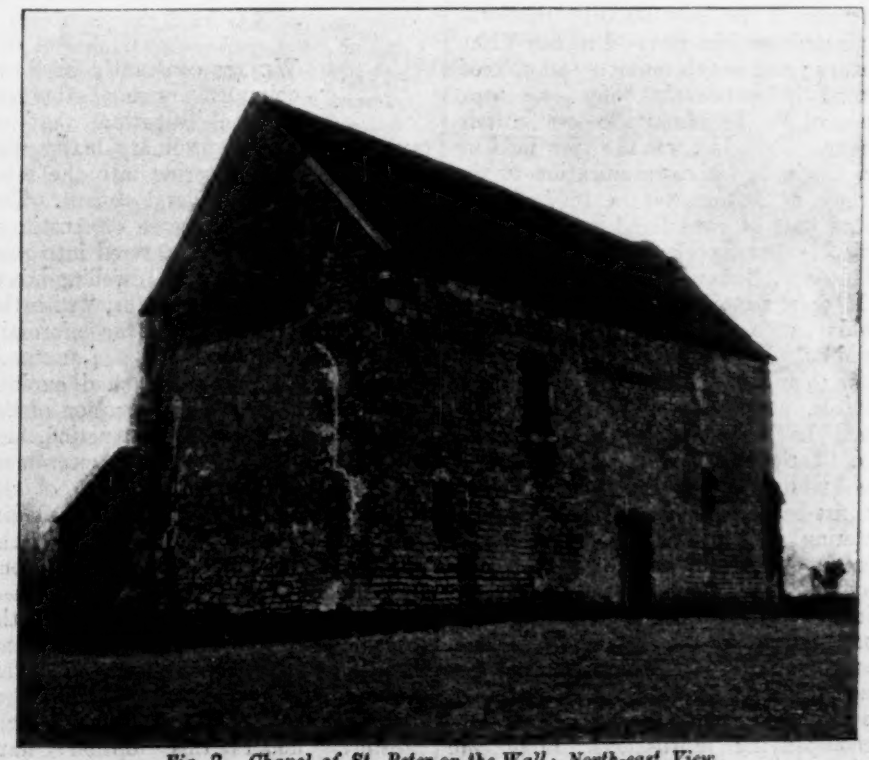

Fig. 2. Chapel of St. Peter-on-the Wall: North-east View.

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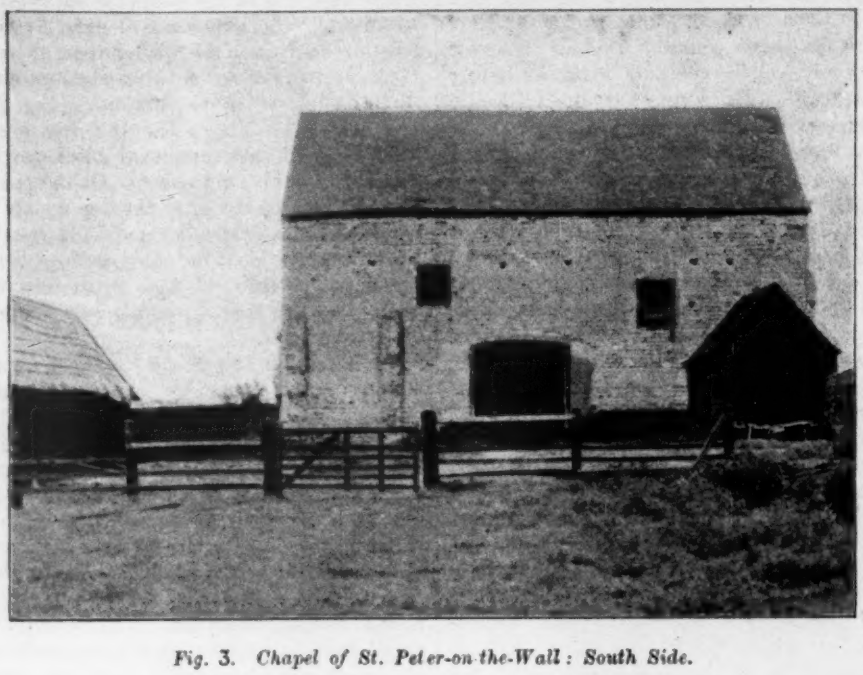


Fig. 3. Chapel of St. Peter-on-the-Wall: South Side.

from the rest of the fabric that they can be Early English. Such buttresses, too, are equally unknown in the later Saxon work of the century or two before the Norman Conquest. Nor are there here any of the usual characteristics of work of that date, such as turned baluster shafts, long-and-short work, minute double-splashed lights, etc. On the other hand, however, such low buttresses as these, and similarly placed, are to be found in several of the earliest Anglo-Saxon churches of the Augustine influence which have, like this at Bradwell, an eastern apse and a western porch.

Mr. Peers, F.S.A., in a valuable paper on "Saxon Churches of the St. Pancras Type"—and we have no better authority on such points—which he contributed to the *Archæological Journal* for 1901, compares this building to the churches of St. Pancras, Canterbury, Monkwearmouth, Corbridge, and Brixworth. He seems to have no doubt that this is the very building that was originated by Bishop Cedd in the VIIth century; and in this opinion—an opinion formed independently before we were aware of Mr. Peers's article—we entirely concur. This, too, was the view held by Mr. Lewin in his communication to the Society of Antiquaries in 1867, for he stated that he considered it to be "the veritable handiwork of the old Saxon missionary, Bishop Cedd."

It only remains to add a very few words as to the later history of the building. Its use as a place of worship came to an end, with so very many other chapels, at the time of the Reformation. In the days of Elizabeth, James I., and Charles I., there is some record of the building being used as a lighthouse or fire-beacon to guide the shipping entering the Blackwater. This would account for several coins of these reigns having been found in the immediate vicinity of the chapel. Then came a further degradation, begun, we believe, early in the XVIIIth century, when this ancient church of St. Cedd was utilised, as at present, for farm purposes, with its accompanying mutilations. From the point, however, of mere preservation, it is as well that the building was found to be sufficiently substantial to serve as a barn; for otherwise the fabric would have probably become a complete ruin. Yet, apart from all ecclesiastical or Christian sentiment, would it not now be possible to disassociate so unsurpassingly interesting a relic as this, of the highest architectural value, from utilitarian farm purposes, and thus preserve it from further disintegration?

When trenches were being driven round the chapel in 1865, during the investigation of the camp, a considerable number of human interments were found about the east end (which was within the camp); all of these had been placed facing the east, after the Christian fashion. This was not the case with a variety of interments found not far from the west end of the chapel and in other adjacent parts; the Romans would, naturally, bury outside the camp.

NOTES.

Landlord v. Tenant.

WE are constantly in these columns drawing attention to the litigation that is caused by the extraordinary laxity displayed by those entering into the relationship of landlord and tenant. The latest example is the case of Austin *v.* Newham. The tenant entered into possession of a shop and dwelling-house for a period of twelve months, "with the option of a lease after the aforesaid time at the rental of 30*l.* per annum." Before the twelve months had expired the landlord demanded possession of the premises at the end of that period, and commenced an action for ejectment. In the Court below the judge of the Norwich Guildhall Court of Record dismissed the action for ejectment on the ground that the above agreement, when the option was exercised, created a further tenancy for a year from the expiration of the first twelve months. The Divisional Court have upheld this finding, but intimated an opinion that had the tenant claimed it he might possibly under this option have claimed a lease for his life. These options require much consideration; thus in our issue of June 24, 1905, we draw attention to the case Woodhall *v.* Clifton, in which an option to purchase contained in long leases was held to be void as offending against the law of perpetuities. In the case under consideration the landlord has reason to be thankful that his tenant had not claimed all he could have been entitled to under this slipshod agreement.

Drain or Sewer.

THE case of Williamson *v.* Durham Rural District Council (*Law Reports*, July) raised a point of some interest which we have not yet noted. The district council had taken proceedings against the appellant under sect. 95 of the Public Health Act, 1875, for causing a nuisance by allowing sewage from his farm to pass into a pond down a pipe vested in the council. This pipe, before the passing of the Local Government Act, 1894, had been vested in the then highway authority; the Local Government Act placed the duties of the highway and sanitary authorities then existing in the hands of the district council, and the appellant contended that the pipe was then converted into a sewer and the district council became responsible for the disposal of the sewage. By sect. 4 of the Public Health Act, drains vested in any authority having the management of roads, not being a local authority under the Act—*i.e.*, an urban or rural sanitary authority—are especially excepted from the definition of "sewers," and the Divisional Court held that the fusion of the two authorities into one by the Local Government Act did not alter the character of existing drains.

The Embankment Tramways.

COMMENDABLE promptitude is being displayed by the London County Council in the construction of the new tramway lines along the Victoria Embankment and over Westminster Bridge. Large quantities of material have been delivered on the site and operations are in active progress. The new lines, both across the bridge and along the Embankment, will be laid as recommended by the Select Committee of the House of Commons on one side of the roadway on the downstream side of the bridge and the river side of the Embankment—an arrangement that will probably be satisfactory, so far as traffic conditions are concerned, under the exceptional conditions, although manifestly unsuitable in general practice. One very great objection to the position of the lines as already laid out on the Embankment is that they do not leave sufficient room for the passage of cars under the trees, and we fear that it will be found necessary to spoil the appearance of the thoroughfare by lopping branches off the trees on the inner side. At present the contracts settled do not provide for lines beyond John Carpenter-street, as the extension destined to link up Blackfriars terminus cannot be undertaken until the bridge has been widened by the City Corporation. Simultaneously with the extension of the works mentioned, the Council are arranging to continue the new subway from the Strand to the Embankment with a new station beneath Wellington-street:

This extension will furnish the long-talked-of through route between the northern and southern tramway systems. Unfortunately, as we have before pointed out, the double-decked cars in general use will be unable to enter the subway. Hence all through-passengers will be compelled to change from one vehicle to another unless single-decked cars are to be run between the north and south. Of course, some passengers would have to change in any case, as the subway could not possibly accommodate all the cars that converge at Westminster and Blackfriars respectively, and the circular service ultimately to be established will also render the transfer of passengers necessary.

Means of Escape from Fires in Factories.

WITH the view of encouraging district councils to apply the powers conferred on them by sect. 15 of the Factory and Workshop Act, 1901, the Local Government Board have drawn up a set of model by-laws, proposing certain means of escape for factories and workshops in which not more than forty persons are employed. Clause (3) providing for the construction of adequate stairs and steps, permanently fixed, in buildings of more than one story is satisfactory so far as it goes, but the construction ought certainly to be of approved fire-resisting materials. The clause stipulates that such materials shall be used in every new factory building and every old building converted for use as a factory, but it requires amendment to include every new staircase, and the supports thereof, provided in any factory building of the kind contemplated by the clause. Clause (4) makes additional requirements for factories where any floor is more than 30 ft. from the ground, and in which either more than ten persons are employed or readily inflammable materials are stored. Three alternatives are stated: "(1) an external staircase be constructed of fire-resisting material, or (2) an efficient and suitable fire-escape, or (3) ready means of access to the roof of the building, and where practicable to the roof of any adjoining building." Here the third alternative is distinctly insufficient. No doubt the roof of a burning building is a more agreeable situation than the interior; but it is not a safe retreat, and means of escape from it are clearly necessary. By omitting the words "where practicable" the alternative would meet the case properly.

The Housing Question in Liverpool.

THE Liverpool City Council, at a meeting last week, has given distinct evidence that, in regard to artisans' dwellings, it does not intend to compete with private owners. The policy of the Council is not to build artisans' dwellings except when it is necessary to rehouse persons who are dispossessed of their homes in consequence of public improvements. An amendment was proposed to the effect that a scheme be prepared for building artisans' and workmen's dwellings, not necessarily for the dispossessed, on the outskirts of the city, and this was negatived by fifty-two votes to thirty-eight. Unless private enterprise fails to provide workmen's dwellings, there is no reason why municipalities should take up the matter. Probably the safest way to encourage private enterprise is by such action as this of Liverpool, as the field is at once clear and safe for private owners. Municipalities have now so many irons in the fire that they should not, unless it is absolutely necessary, increase their duties, responsibilities, and expenses.

Liability of Motor-car Owners.

MOTOR-CAR owners should take note of a decision given last week in the City of London Court against one of the motor omnibus companies. The omnibus had run into a van and caused damage to that, and the defence was that the accident was due to "skidding," and that the defendants were not liable. The propensity of mechanically-propelled vehicles to "skid" and "side slip" is well recognised, and there is nothing in the legislation on the subject to vary the well-established principles of law that a man must use his own property in such a manner as not to injure other people, and that the owner of anything likely to cause damage uses it at his own risk. The defence of inevitable accident only applies to something happening entirely unforeseen, and which cannot be prevented by the greatest care and skill. Where, as in the case of side-slip, the danger is clearly foreseen, it seems impossible for this defence to be successfully set up.

The Utilisation of the Rhine.

HITHERTO it has been customary to instal a hydraulic power station at the foot of waterfalls or rapids. The power stations at Niagara and on the rapids of the Rhine at Schaffhausen are examples. At the conference of engineers, however, recently held at Mulhouse, in Germany, Mr. Koechlin read a paper, giving full particulars of a project for utilising the water power of the Rhine in Haute-Alsace. We learn from *L'Electricien*, which publishes the paper in full that the part of the Rhine which it is proposed to utilise lies between Basle and Vieux-Brisach, where the rate of the fall is only 1 in 1,000. As the minimum flow of water is about 300 cubic yds. per second 5,000 horse-power per mile is obtainable. The water is cleaner, and there will be less difficulty with blocks of ice, etc., in winter than in mountain torrents. It is proposed to build two power houses, each capable of generating 30,000 horse-power. A side canal will be constructed of gentle incline, and a partial *barrage* will be built. If necessary, boats will be able to pass up this canal. The beginning of the canal flowing to the second station will be the exit from the first station. The hydraulic power will be converted into electric power at a pressure of 30,000 volts, and will be distributed in Haute-Alsace and the Grand Duchy of Baden. In particular Mulhouse will be served by two transmission lines, which will be absolutely independent, so as to insure against an interruption of the supply. There are several electric hydraulic stations at present working in Europe at higher pressures. At Caffaro, for instance, in the north of Italy, the pressure is 40,000 volts. The upper Rhine scheme, however, is on a much larger scale than any hitherto proposed in Europe. The objections that have, very properly, been urged against diverting the water from waterfalls in order to turn turbines apply, generally in a much less degree, to diverting water from a river into a parallel canal. If the project is carried out successfully it is highly probable that similar schemes will be proposed on other slow-running rivers, and so important economic results will follow.

The Croton Reservoir: New York.

ALTHOUGH the Croton reservoir has been in use for nearly eighteen months, the dam has only just been finally completed. The more important auxiliary works were the construction of a steel arch bridge across the new spillway channel at one end of the main dam, the formation of a driveway 18 ft. wide over the bridge, and along the crest of the dam from side to side of the valley, a distance of nearly 1,400 ft.; and the establishment of an ornamental park on the downstream side of the dam. The new bridge crosses the channel by a single span of 200 ft. It is a graceful structure, but quite out of keeping with its surroundings, and destroys the harmonious effect contemplated by the original designs. The roadway serves as a connecting link between two roads following the shores of the reservoir, the whole forming a continuous highway more than 40 miles long, crossing various arms of the lake by steel bridges on granite piers. The new park has been laid out among the extensive heaps of material excavated for the foundations of the dam, which under the hands of the landscape gardener have been so treated that they no longer disfigure the naturally picturesque valley. Access to the park is afforded by a steel bridge of 150 ft. span across the dry bed of the Croton river, whose duty in future will simply be to serve as a channel for carrying away any water passing over the spillway of the dam in time of flood, and discharged from the blow-off gates for purposes of cleaning the reservoir.

The Glasgow Telephone Service.

BY the transfer of the Glasgow telephone system to the Post Office, the most important municipal telephone enterprise in this country comes to an end. The Glasgow exchange, now including about 12,000 subscribers, was established, in 1901, as a protest against a telephone monopoly in the hands of a private company whose service was both dear and unsatisfactory, and it may justly be said that Glasgow has indirectly been the means of benefiting the country at large by bringing the telephone company to see the advantage of more enlightened methods. In view of the transfer of all telephone services to the Post Office in 1911, no object was to be gained by the continued prosecution of a commercial enterprise that involved a certain amount of risk to the money of the Glasgow ratepayers. As a matter of fact, advantage will follow the amalgamation of the two services, hitherto conducted separately by somewhat uncompromising trade rivals.

D

A Test for Varnishes.

A METHOD of testing the hardness and elasticity of varnishes was described in a paper recently communicated to the Royal Scottish Society of Arts by Dr. A. P. Laurie and Mr. F. G. Baily. A film of the varnish is distributed over the surface of a warm glass plate and allowed to dry, and is then subjected to the pressure of the hard steel blunt point of a testing apparatus which has been specially devised for this purpose. The varnished plate is drawn under the point, the pressure from which is gradually increased, until a white scratch appears upon the varnish. Full details regarding the construction of the instrument and the method of conducting the test are given by the authors. Varnishes prepared from copal or kauri resins with oil and turpentine were found to require much greater pressure than mastic spirit varnish. When commencing the test the blunt point is always placed at the same height, at a mark called zero, and an arbitrary scale to represent the comparative degrees of hardness corresponding to the increasing pressure of the point upon the varnish may be used. We doubt whether the testing of varnish films upon glass plates will ever be of much use in indicating the value of the varnishes as coatings for wood, but the valuation of commercial varnishes is admittedly very difficult, and it is possible that in the hands of an experienced user of varnishes the instrument may be found to be of some service in the investigation of samples submitted for trial.

Improvements in the City of London.

THE annual Report of Mr. Sumner, M.Inst.C.E., Engineer to the Corporation, gives particulars of steps that have been and are about to be taken for widening and improving many of the streets at certain points — embracing Giltspur-street, Warwick-lane, Little Britain, Seething-lane (east side), Jewry-street, and Crutched Friars. The widening of Fleet-street is to be continued as opportunity serves, and a "give-and-take" arrangement is made in respect of the new frontage for Nos. 1-6, Lombard-street, between Mansion House-place and St. Swithin's-lane. Numerous freehold and other interests are acquired for widening the thoroughfares in Mansell and High streets, Aldgate. In respect of the alterations in Lombard-street, we may point out that Nos. 1-6 were built after the plans and designs of Sir Robert Smirke, R.A., as part of the scheme of William Mountague, City architect, for the laying-out of King William street in 1824-30, when the former Nos. 1-10 on the south side of Lombard-street, together with Little Lombard-street and Dove-court, were pulled down. No. 1—Union Bank of London and Smiths—was then rebuilt on the site of Harley & Co.'s banking-house, by sign of the Cock, into which Messrs. Smith, Payne, & Smiths removed from No. 18 at the close of the XVIIIth century. Before the Great Fire the site of the Cock had been that of the Angel, occupied by John Lindsay, goldsmith. Some years ago a cast-iron slab, bearing the device of a cock and serpent, with figures "1652," was found during some alterations at No. 1. Messrs. Smith, Payne, & Smiths amalgamated their business in July, 1902, with that of the Union Bank of London.

Carnarvon Castle.

THE Office of Works have instructed their architect to confer with the Mayor of Carnarvon as to housing in the Castle the collection of antiquities given to the borough council by Lady Turner. In a letter addressed to the council they state that in the contemplated restoration of the fabric they will make no attempt to restore it to the original condition, but confine themselves to preserving it as a historical building and a memorial of the past. The walls of that magnificent ruin inclose an area of about three acres, and have in their thickness a gallery with loopholes. Of the many turreted towers the largest is known as the Eagle Tower, completed in 10 Edward II., and containing, by tradition, the room in which he was born. The building of the castle was begun in 1283, the cost being defrayed out of the revenues of the vacant archbishopric of York. Henry de Elreton is named as "master-mason"; he used a grey limestone from Twr Kelyn, in Anglesey, and gritstone from the neighbouring Vaenol. The natural position of the fortress was well-chosen, being bounded on three sides by the Menai and an estuary of the Seiont; near the latter are the remains of an ancient fort, and a little farther, in the direction of Llanbeblig church, is the site of Segontium. The Parliamentary forces captured the town and castle in 1644; the King's army, under Lord Byron, again recovered the castle, which, however, in 1646 was surrendered. An order of 1660 for dismantlement was by some means partially evaded, and the property became vested in the Crown. There are records of the erection of the eagle on the Eagle Tower, in March, 1317; and of the King's effigy, in April, 1320, over the gateway, which had four portcullises. One of the towers was the prison-house of William Prynne. The late Sir Llewellyn Turner, deputy-constable, applied the admission fees to minor works of reparation, and his successor, Mr. C. A. Jones, has similarly contributed towards the general scheme of restoration.

LONDON HOSPITAL.—Mr. Rowland Plumbe, who has been for many years architect to the London Hospital, has been appointed a member of the Hospital Committee, in place of Sir Edgar Speyer, who has resigned.

SALE OF A CITY SITE.—The Mercers' Company, as trustees of Sir Richard Whittington's Charity, have arranged to sell the freehold, known as 7, Mumford-court, City, containing 585 sq. ft., or thereabouts, with the buildings erected thereon, for the sum of 3,350*l*.

BALKANS EXHIBITION.—A Balkans Exhibition will be held at Earl's Court next year. The Bulgarian Government will contribute a large variety of exhibits relating to the history, mineralogy, industries, and fine arts of their country, as well as its agricultural cultivation, with some representative artisans and labourers.

MEMORIAL OF DEAN HOLE, ROCHESTER CATHEDRAL.—The memorial of the late Dean Hole is now being set up at the southern extremity of the south transept of Rochester Cathedral. It takes the form of a recumbent figure of the late Dean in statuary marble, the work of Mr. F. W. Pomeroy, A.R.A., which rests upon an altar-tomb of alabaster designed by Mr. C. Hodgson Fowler, F.S.A., the Cathedral architect.

NOTE ON THE RESISTANCE OF BUILDING STONES TO FROST.

By PROFESSOR J. MALETTE, of Paris.

ATMOSPHERIC variations exercise so prejudicial an effect upon certain building-stones that the opening of a new quarry is a matter of considerable importance, for architects and engineers do not adopt materials from fresh sources without being fully satisfied as to their reliability. The prudence of this course is further justified by the fact that cases have occurred where builders have been compelled to suspend operations because they have been insufficiently informed as to the resistance to frost of the stone employed. Therefore it must be agreed that the resistance of structural materials to frost is a question of primary importance.

During a long period the Brard process was the only means by which account could be taken of the characteristic of stone to which attention is here directed. Although not enabling the problem to be solved in a direct and absolute manner, it furnished approximate results that were formerly accepted as sufficiently satisfactory.

This process was conducted by immersing a fragment of stone with sharp edges, or preferably a cube measuring a few centimetres across, in a cold saturated solution of sodium sulphate. The solution was then boiled for thirty minutes, after which the stone was removed and exposed for eight to ten days in a chamber where a moderate and constant temperature was maintained. At the end of this period the specimen was examined. If it remained intact, its resistance to frost was considered to be satisfactory. On the other hand, if the edges had lost their sharpness, showing splinters that appeared to be on the point of separation and that could be carried away by a jet of water from a wash-bottle, it was regarded as liable to injury by frost.

Some modifications were made in this mode of operation by MM. Vicat, Héricart de Thury, and Husson, who attempted to render the details of execution more methodical. These scientists recommended that observations should be made at the end of predetermined periods, and that the particles carried away by washing after each period should be weighed for purposes of comparison.

In spite of these modifications the process still presented the grave defect of indicating materials as liable to injury, by frost which were not so affected, the fact being that much of the deterioration observed was caused by unduly protracted treatment.

M. Braun then attacked the problem in a different manner. He proposed to characterise as liable to injury by frost all stones whose resistance to tension is less than the expansive force of water at the moment of congelation. This idea was certainly rational, since it is precisely the increased volume of water in passing from the liquid to the solid state that causes the disintegration of stone under the influence of frost. But the absence of exact experimental methods and the inadequacy of the results obtained caused M. Braun to abandon his process.

In the present day the resistance of stone to frost is determined by laboratory tests based upon successive and rapid variations of temperature.

The specimen of stone selected for examination is cut in the form of a 7-centimetre cube, which is submerged in a vessel containing water. The vessel is placed under the receiver of an air-pump, air being exhausted until a partial vacuum of 10 in. is obtained. The quantity of water absorbed is naturally governed by the porosity of the material. If the stone is not to be employed under water it is sufficient to accept the natural absorption of the cube after immersion in water for twenty-four hours. After saturation the cube is introduced into an apparatus containing a freezing mixture capable of maintaining during several hours the temperature of from —20 deg. to —15 deg. C. After being exposed for four hours to the temperature of, say, —15 deg. C. the cube is removed from the apparatus and immersed in distilled water, or, in default, in drinking water, of which the temperature is +15 deg. C. The specimen is then examined. In cases where distilled water is employed for washing the water is collected and examined for soluble salts. After a second

immersion in water the cube is again submitted to a second freezing process, at +15 deg. C., for four hours. The process is repeated so as to subject the materials to twenty-five freezings and thawings in succession. Finally, the stone is examined under the microscope.

Fig. 1 represents marly limestone treated in the manner described above. The surfaces have suffered considerably, being broken up by cracks into fine splinters. This effect is often noticed in the case of weak stones and

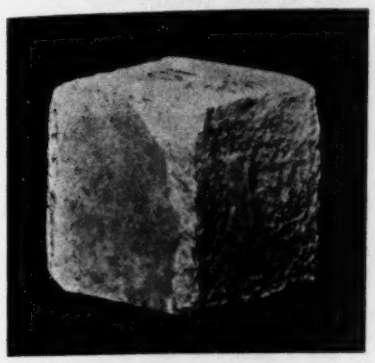


Fig. 1. *Calcaire marneux.*

of stones, such as argillaceous and sandy limestones, and calcareous sandstones, formed of hard elements united by cementitious material of low cohesive power.

Fig. 2 shows the appearance of a lacustral

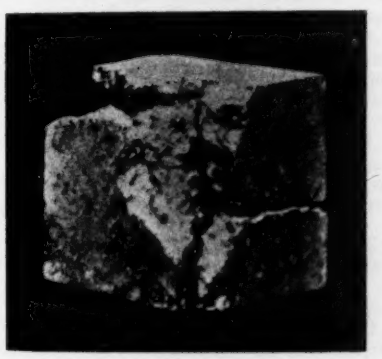


Fig. 2. *Calcaire lacustre.*

limestone, divided into irregular fragments, with disintegration of the edges.

Fig. 3 is a sub-oölithic limestone, divided

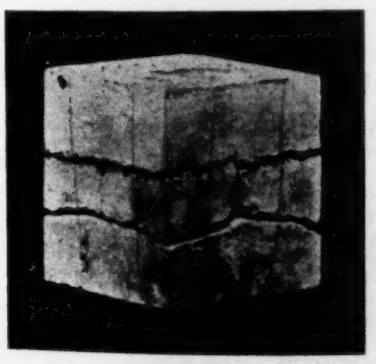


Fig. 3. *Calcaire sub-oölithique.*

into thin and fairly regular laminations, the soft parts of which are very apparent.

Sometimes the tests are completed by determining the compressive strength of the stone under examination, the specimens being dried after twenty-five successive freezings and thawings, and by comparison of the resistance with that of the original stone tested in the dry state and after the absorption of water to the point of saturation.

TECHNICAL SCHOOL, BATLEY.—The Technical School and School of Art at Batley was re-opened on the 8th inst., after extensions and improvements, which have cost 5,000*l*. Mr. A. W. Hanstock was the architect of the work.

MAGAZINES AND REVIEWS.

TO THE *Burlington Magazine* Mr. Tavenor-Perry contributes a long article, illustrated by a number of interesting though rather small drawings, on the subject of "The Ambones of Ravello and Salerno," which he regards as worthy of more notice than they have received, and as in all probability the productions of Lombard artists educated in the Greco-Roman school of Monte Cassino, and influenced largely in their designs by Saracenic workmen. The curious mixture of severe classical lines in the general design with an Oriental character in the decorations, which distinguishes these ambones, would be accounted for on that hypothesis, no doubt. Mr. C. J. Holmes concludes his essay on "The Development of Rembrandt as an Etcher." The comparison of the early and last states of the "Three Crosses" (in other words, "The Crucifixion"), is a striking instance of Rembrandt's extraordinary phases of feeling in regard to the treatment of his works, the "fourth state" being apparently the result of a sudden impulse to make something more tragic out of the whole scheme, in view of which a whole mass of figures is obliterated and the design reduced to an effect of light and dark. In a less bold manner the third state of "Christ Presented to the People" is metamorphosed in the fourth state, by the obliteration of nearly all the figures in front, leaving a kind of stage with two dark arches in it as the support to the principal group. The illustrations include a reproduction of the wonderful design of "Dr. Faust," with the light emanating from the cabalistic sign appearing in front of the window. This is one of the most remarkable of all Rembrandt's conceptions; yet in it we notice, as in most others of his works, how the value resides in the total effect and not in the conception of the personages; the head of Faust is a commonplace head of a man in a nightcap of the period; it adds nothing to our conception of Faust, though the design as a whole adds immensely to our conception of the mysterious power of the Faust legend. The "Christ Entombed" is to our thinking overrated, except as a piece of composition and lighting; nor can we by any means agree that as an interpreter of sacred scenes Rembrandt claims a place with Fra Angelico. We can see none of the spirit of reverence or faith in Rembrandt's religious scenes; on the contrary, he seems to us to regard them merely as opportunities for powerful experiments in effect.

In the *Art Journal* Lady Victoria Manners writes the second and concluding part of an article on "The Pembruge and Vernon Tombs at Tong," the illustrations of which bear out what is said as to their interest and beauty. We quite concur in the expression at the close of the article, that "lovers of the beautiful would do well to study more carefully the exquisite and often little known memorial sculpture in English parish churches." "Some Drawings of Chiswick," by Mr. E. C. Clifford, reproduced apparently from pencil drawings, are models of sketching of this kind, and show how much of picturesqueness is still left in Chiswick. A very good colour print of Strand-on-the-Green is added, but we prefer the monochrome sketch. The drawings are accompanied by some notes by the artist. We learn from the *Art Journal* that there is some hope that Mr. Holman Hunt's really great picture "The Lady of Shalott" may be acquired for the Tate Gallery. There could not be a better representation of a remarkable though unequal painter. The frontispiece to the number is a reproduction of Opie's charming portrait of "Mrs. Warde" which was exhibited this year in Gallery I. at the Old Masters Exhibition at Burlington House.

The *Berliner Architekturwelt* contains two curious examples of the eccentricities of modern German street architecture, in "Das Grüne Haus" at Charlottenburg, by Herr Gessner, and a House in Flats in the same suburb, by Herr Linkenbach. The former consists of apparently cemented or roughcast walls (from the title, we presume these are coloured green), portions of which stand upon plain square pillars partially decorated with a kind of trellis pattern. The whole seems an attempt to get rid of architectural details as much as possible, and reduce a large street house to the appearance of a magnified hut. The other, the "Wohnhaus," has the wall on the lower two stories covered with a checquer pattern; above this is a string-course formed by an immense and clumsy moulding from which spring a series of narrow piers running up the front and apparently decorated with sgraffito. It is a kind of architecture run mad. The "Neubau des Kriminalgerictsgebaüdes," by MM. Thömer and Vohl, seems to indicate that official architecture, at all events, still clings to masonic formulæ; this is an effective and freely modelled classic front. A "Decorative Malerei" by Herr Dahmen is ingenious and effective, and we like the treatment of an access to an underground passage in the Wilhelms Platz, by Herr Grenander, the solidity and simplicity of which contrasts favourably with the eccentric entrance hoods put up in Paris over the stairs to the Metropolitan railway stations. The number contains a short essay on "The Modern Cemetery" by W. C. Behrendt. The author expresses his surprise at the cemetery and its monuments having been so long neglected by the modern movement in art. Indeed, it was not till after landscape gardening was acknowledged to rank as an art that the laying-out of cemeteries was considered from the artistic as well as from the utilitarian point of view, yet even now the monuments for the most part are the produce of the uninspired artisan and perpetuate the hideous style in vogue in the seventies. Herr Grässel, who planned the new cemeteries of Munich, may be styled the creator of the modern cemetery, for he has shown how by terracing the land the greatest economy in ground space may be united with artistic planning, and how by the suitable disposal of chapels, fountains, seats, and hedges the eye may obtain rest from the prevailing monotony. Exhibitions are now encouraging this branch of art, and at Dresden this year a tract of land was reserved for a miniature grave-yard. It was laid out by Max Hans Kühne, who turned to advantage the natural irregularities of the site, while the red-roofed chapel with glistening coloured windows, the enclosing walls niched for urns, the family vaults, grave-stones, and tablets are all the work of gifted architects and sculptors, and present a fine contrast to the usual trade designs. It should be borne in mind that the cemetery is not only a spot dedicated to the past, but that it should also testify to the sentiments of the living present.

The plates of the *Architektonische Rundschau* are chiefly occupied with illustrations of the buildings of the exhibition this year at Nuremberg, which, though not very beautiful, display a good deal of original character, especially those bearing the name of Professor Ullmann, of Nuremberg.

Concrete and Constructional Engineering for this month is a very good number. Captain Sewell, U.S.A. Army, gives some instructive notes on "Constructional Lessons from San Francisco," illustrating his remarks with photographic views taken for him on the site of the recent fire. Dr. Desch concludes his short series on "The Setting of Portland Cement," devoting attention this month to the micro-structure of that material. Mr. Twelvetrees discusses further types of "Reinforced Concrete Bridges," one interesting example in Great Britain being Tuckton Bridge, Bournemouth, with a total length of 353 ft., and specially designed for heavy tramway traffic. "Reinforced Concrete Railway Sleepers" is the subject of an article by Mr. G. H. Kimball, which deserves the study of British railway engineers. In addition to the foregoing original contributions, a large amount of useful matter relative to plain and reinforced concrete will be found in the same issue of the magazine.

In an article in the *National Review* on "The Development of the Steam Turbine" Mr. C. A. Parsons and Mr. H. G. Dakyns, jun., point to the remarkable evolution in applied mechanics that is represented by the history of this latest type of steam engine. There is a wide gulf between the original 10 h.-p. turbine, built in 1884 and now in the South Kensington Museum, and the perfected machine of more than 10,000 h.-p. at present in course of construction for the *Lusitania* and the *Mauritania* of the Cunard Line. While the embryo turbine of 1884 was coupled to a dynamo running at 18,000

revolutions per minute, these latest developed engines will be coupled to screw propellers for operation at less than 200 revolutions per minute. The development of the turbine on land has been largely aided by the vibration troubles caused by the use of reciprocating engines in buildings near central electricity stations, and more recently by the fact that turbines can be built in sizes quite impracticable for reciprocating steam engines. In view of the vibration known to arise from prime movers of the latter type, it is astonishing that the London County Council should have adopted them at the tramway generating station which so seriously threatens the Greenwich Observatory. After citing the progress that has been made in turbines for use on land, the authors turn to its application to marine work, which, though historically second, soon became first in importance. The satisfactory results achieved on cross-Channel steamers and ocean liners are well known to most of our readers, and it is reported in the *Naval Annual* for this year that the Admiralty have decided that practically all vessels being built for the Royal Navy are to be fitted with Parsons' turbines. While believing that the turbine will ere long entirely supersede the reciprocating engine in vessels of 16-knots speed and upwards and over 5,000 indicated horse-power, the authors do not think it probable that reciprocating engines will be altogether replaced by turbines in slower vessels, as the increased diameter and weight for a small number of revolutions would be prohibitive. In the facts that on land nearly two million horse-power of Parsons' turbines are either at work or being built, and that on sea about one-fifth of the total steam tonnage of the world is similarly propelled, we have ample proofs of the useful part already played by this form of prime mover. That so important a development has been achieved by and on the initiative of British engineers is indeed a matter for congratulation.

In the *Fortnightly* "Cygnus" writes a very good article on "Motor-cars in the Present and Future." Among other points he suggests that if the idea embodied in the Kriéger system, that a car may be driven by electricity generated by a separate engine on the car, can be simplified and worked economically, the petrol-driven car will become "as obsolete as a pack horse." We agree with the writer in thinking that legal speed-limits are a mistake. What is wanted it legal responsibility on the part of the owner of the car for any and every injury caused by his machine. Speed-limits on open roads are, as he says, "merely irritating," while the possession of a speed-limit encourages the driver to work up to it in places where he should not. In regard to the matter of dust, the writer suggests that the owner might be liable to pay compensation for special injury or inconvenience caused by the dust he has raised. The necessity for a permanent improvement of the high roads, in view of motor-car traffic, is well insisted upon at the close of the article.

The *XIXth Century* contains an article by the Rev. E. Ledger, Gresham Lecturer on Astronomy, on "Halley's and other Comets," being a summary of the present position of knowledge and scientific speculation in regard to these erratic members of the solar system.

In *Scribner* Mr. John Vaughn (*sic*) gives, under the title "The Thirtieth Anniversary of a Great Invention," a history of the invention and improvement of the telephone, with sectional diagrams of Bell's first telephone and of one of the latest models.

In *Harper* Mr. W. D. Howells gives his impressions of "Kentish Neighbourhoods—including Canterbury," and writes with much eloquence and genuine feeling of the impressions produced on him by the beautiful cathedral, the exterior view especially. The pretty illustrations to the article are by Mr. Howe Bailey, who includes among them a sketch of one of those glimpses of old houses rising out of a watercourse that flows between them, which are to be seen at various points in going through Canterbury streets, and in a vague way remind one of Venice—with a difference. Also should be mentioned Mr. Janvier's article on "A Little Mexican Town" with its Toltec name—Coyoacán, the description and illustrations of which take one quite out of the beaten track of archæology. The town is connected with the name of Cortes, and the house still stands in which it is averred that he killed his wife—why, no one seems to know. The fact of the murder appears to be authentic, whether the house is so or not.

The *Antiquary* contains a very interesting article on a new subject—"Venetian Bridges and Street Names." It gives an account of some Venetian legends and superstitions, and their connexion with the names of some streets (or canals) and bridges. Mr. E. C. Vansittart is the author.

MOTTOES ON MANTELPIECES.

THE custom our forefathers originated of placing mottoes and texts upon their chimney-pieces, as well as upon their doorways and over their windows, is not yet quite discontinued, for the late Lord Armstrong caused a motto to be placed on the chimney-piece of the dining-room in the fine mansion he built on the Rothbury Hills, in Northumberland. He chose the familiar words, "East or West, hame is best," which give a restful and welcoming air to the large and pleasant room and its hospitalities.

Looking, however, to early examples, we may note the wording on the mantelpiece of the housekeeper's room in Arbury Hall, Warwickshire, which says, "Truste in God, and feare Him with al thy harte." George Eliot described this room in "Mr. Gilfil's Love Story," and gave the motto with a difference, as heralds say: "Fear God and Honour the King." Sir Walter Scott, it may be mentioned, too, said that the chimney-front in the Quaker's parlour described in "Red Gauntlet" was inscribed with "Trust in God," showing that he, also, appreciated the quaintness of these inscriptions.

The carved mantelpiece of the banqueting-hall in Farnham Castle has "A Dieu Foy. Aux Amis Foyer," which has been amplified into "To God we yield the faithful heart, the hospitable hearth to friends." One of these inscriptions in the hall of the Vicars' Close, at Wells, says, "In vestris precibus habeatis commendatum Dominum Ricum Pomroy, quem salvet Deus. Amen." Another, in the porter's lodge in the grand old hospital of St. Cross, at Winchester, says simply, "Dilexi Sapientiam." Over the fireplace in the long-room at Boughton, Northamptonshire, we may read, "Ne sis Argus foris et Doun Talpa," which may be translated, "Do not be an Argus at home and a mole abroad." At Knolle, in Surrey, there is another Latin example, "Æstate frigeo Hyeme incalisco."

Some of the chimney-pieces in the manor-house of South Wraxall, near Bath, have inscriptions. "Death seizes all" is one of them. This is the house in which Sir Walter Raleigh lived for some time. Carbrook Hall, near Sheffield, has a chimney-piece lettered, "Understanding reacheth Heaven. Understanding is a well-spring of life. Good understandings depart from evil. Ignorance is a beast." A mantelpiece in Widemarsh-street, Hereford, reads, "When ye aytte by ye fyre to keep yr selfes warme, take heed leaste vr tongues doe yr naybours noe harme."

In the gatehouse of Leeds Castle, Kent, someone has cut upon the mantelpiece in the Constable's room these words, "Whyle that ye may my ladye plese, not sors of travayle the werke, quoth Oracium." This is supposed to have been cut to pass away the time by some resident who found abundant leisure in the moated residence in question.

Sometimes old inscriptions are uncovered in the course of alterations. A mantelpiece that had been bricked up in an upstairs room in a house in High-street, Tewkesbury, was found to have the following lengthy inscription on it when opened out a few years ago:—"Three things pleseth boooth God and man: concorde between bretheren: amytie between nayghbours: and a man and his wyfe that agreeth well together. Fower things hurt much the site of man: teares, smoke, wynde and the worst of all to se his frends unluckye and his foee happye. These fyve thyngs are rare sene: a fayre younge womane withought a lover, a younge man without myerth, an old useeror without money, any great fayre withought music." Occasionally these fanciful statements ran round the cornices of rooms, as at Earl's Court, where may be deciphered:—"A nyce wyfe and a back doore often make a rich man poor," and "Trust upon good attturance and try ere you trust for fear of repentance." The fifth Earl of Northumberland followed this fashion and decorated two of his residences, Wressil Castle and Leckingfield Manor-House, with remarks of the same kind:—"He that slepithe in somer in winter sufferithe payne. And he that in youth is ydyll in age must needs complayne. And he that in youthe withe virtu maketh advance in age of all grace shall have plenteous habundance. An old proverb it is meane it is a treasure why sholde not youthe at times enjiye his pleasure." Round the frieze of the dining-room in Speke Hall, near Liverpool, runs:—"Slepe not tell ye hathe considered how thow hathe spent y day past. If thow haue well don, thank God. If othr. ways repent y." It was not, however, always admonitions that lit up cornices. On a frieze in Ripley Castle is the mere record:—"In the yeare of owre Ld M.D.M.V. was this howse buylded by Sir Wyllyam Ingoldsby, Knight, Phillip and Marie reigning at that time." The lettering in some instances extended to beams. Thus, at Somerset Court, South Brent, some vanished hand placed:—"I wrong not the poor, I fear not the rich; I have not tooe littel, nor I have not tooe much. I was set up right and even." Another beam in a house on the confines of two counties, at Meppenshall, said, "If you wish to go into Hertfordshire, bitch a little nearer the fire."

Wales has some examples of this old-world lettering, though not so many as Scotland, where we find doorways, windows, and walls very frequently thus enriched, as well as the internal features of dwellings. A Welsh mantelpiece at Newton, near Brecon, has a pedigree upon it:—"John Games, the son and heir of Edward Games, the son of John, the son of Morgan, the son of David Gam, 1582. On God depends everything. Games." This David Gam is the knight mentioned by Shakespeare in the play of "Henry V." as being among the slain in the great battle. And that this record was not singular we have evidence in another mansion at Abermarlais, Carmarthenshire, where a pedigree is set out that goes as far back as King Coel, Emperor of Great Britain. A fine Scottish example has:—"As with the fire, So with thy God do stand, Keep not far off, Nor come thou too near hand."

To return to the mantel-piece. Over the fireplace in the entrance-hall of Aston Hall the founder thought well to place the following lines:—

> If service be thy meane to thrive,
> Thou must therein remain
> Both silent, faithful, just, and true,
> Content to take some paine;
> If love of virtue may allure,
> Or hope of worldly gaine,
> If feare of God may thee procure,
> To serve does not disdaine.

ASIATIC ART AT BETHNAL GREEN MUSEUM.

AT Bethnal Green Museum there is now on view a large portion of the Asiatic collection of Lord Curzon of Kedleston. The collection illustrates the art of India, Burma, Nepal, and Tibet, with a few specimens from Persia, Afghanistan, Siam, and China. The collection is a large one. It will remain on view for some months, and will be varied or added to from time to time. To all who care about the art of the East, and to those who know nothing of it, the exhibition is recommended. That portion showing a number of objects connected with the Coronation durbar at Delhi in 1903 will, of course, attract some attention. Some slight idea of the extraordinary splendour of that occasion is given by a painting in oils of the entrance to Delhi by the Viceroy and native princes on elephants. Many cases contain souvenirs of this event—caskets in silver, ivory, wood, and other materials without number, presented to Lord Curzon by municipalities and other public bodies in India; most of these are without artistic interest from the introduction in their design of Western ideas. Some of the best modern work from the Art Exhibition at Delhi is here on view—specimens in wood, ivory, metal, and jade, of carving and inlay, and costly enamel work from Jaipur. It is a pleasure to see this fine modern work, for it is unfortunately the case that Western ideas and Western methods

are slowly ruining the native art productions, though we hope the evil may be recognised in time to prevent their being exterminated. The domestic utensils, furniture, and images collected by Lord Curzon in Tibet, Sikkim, and Nepal are of special interest; some of the seated figures of Buddha were presents to the Viceroy from the ruling Lamas at Lhasa and Shitgatse, in Tibet. The collection from these sources illustrate a common style and religion. The household implements in use among the Tibetan monks and people are very attractive—bronze and copper tea-pots, beer-jugs, water-pitchers, and lamps, and many other useful and quaint utensils, nearly all fit and beautiful in the treatment of the material and the design for which they are made. The Siam and Burma exhibits are of a more refined order of beauty—faience and lacquer work, ivory carving, and dress fabrics, each example a perfect work of art in its way. The combination of colour, form, and pattern of the cloisonné enamels and porcelain from Pekin, of the textiles in silk and velvet from Persia and India, constitute one of the charms which throw their spell and glamour over the East and make its arts one of the most fascinating and elusive to the student; it cannot be understood apart from the life of the producers.

Architectural Societies.

NORTHERN ARCHITECTURAL ASSOCIATION.—The Association offers to students (and Associates not in practice, nor yet twenty-five years of age) a first prize of books of the value of 2*l.* 2*s.* and a second prize of 1*l.* 1*s.* for the best set of drawings or testimonies of study as required by the R.I.B.A., to be submitted for their Final Examination. Similar prizes will also be given for the probationary work for the Intermediate Examination.

THE MARKET HOUSE, CHIPPING CAMPDEN, GLOUCESTERSHIRE.

THE Market House, Chipping Campden, is a one-storied building situated in the centre of the main street, and is still used for market on Wednesdays. It is in a style common to the Cotswolds, and is built of stone and roofed with stone slates, the roof being supported in the interior with stone columns and wooden beams. P. H. KEYS.

Tudor House, Broadway, Gloucestershire. From a Sketch by Mr. P. Hubert Keys.

TUDOR HOUSE, BROADWAY, GLOUCESTERSHIRE.

TUDOR HOUSE, Broadway, is picturesquely situated in the main street, and is faced with local stone and roofed with stone slates.
P. H. KEYS.

Engineering Societies.

JUNIOR INSTITUTION OF ENGINEERS.—Mr. William B. Bryan, Chief Engineer of the Metropolitan Water Board, has been elected President, in succession to Mr. Dugald Clerk.

Correspondence.

WATER IN TAR FOR ROADS.

SIR,—It is generally agreed that most of our main roads will need reconstruction to meet the requirements of modern traffic, but this costly undertaking will necessarily occupy many years in its fulfilment. If, in the meantime, the dust nuisance can be substantially abated by merely painting the surfaces of the roads with tar, the road authorities will no doubt be prepared to incur the small additional expenditure. During the last two years many papers on the subject of tarred roads have appeared in the *Builder* and elsewhere, but,

Market House, Chipping Campden. From a Sketch by Mr. P. Hubert Keys.

while some surveyors have pronounced tar-painting to be an unqualified success, others have been less happy in their experiences.

It would be useful if those surveyors who have tarred roads under supervision, and who, in the public interest, are publishing the details of their work, would give full particulars as to the nature of the tar used. Two forms of tar are manufactured at many gas works:—(1) Coal tar, which results from the distillation of coal; and (2) carburetted water-gas tar (sometimes called oil-gas tar) which results from the decomposition of certain oils under high temperatures. Coal tar is commonly very viscid at atmospheric temperatures, while carburetted water-gas tar is usually perfectly fluid. Coal tar does not as a rule contain more than 3 or 4 per cent. of water, but carburetted water-gas sometimes contains a much larger amount.

Both descriptions of tar have been used with success for road-painting, but, since it has been stated that the presence of water greatly detracts from the value of the tar for road-painting, surveyors would add to the value of their published work if they would state the proportion of water in the tar used. The determination of the proportion of water can readily be made by any analyst. So far as the writer is aware no such records have yet been made in connexion with the use of tar for road-painting. In those cases in which the tar is heated to about 190 deg. Fahr. in open boilers before use much of the water would be expelled from the tar, and for the determination of the water it would be necessary to take a sample of the hot tar immediately before the tar is applied to the road.

H. F. HILLS.

Books.

A Handbook on Reinforced Concrete for Architects, Engineers, and Contractors. By F. D. WARREN. (New York: D. Van Nostrand Company. London: Crosby Lockwood & Son. 1906.)

ACCORDING to statements in the preface, the object of the author in preparing this volume was to provide a reference handbook with the view of enabling busy men to design structures in reinforced concrete without being compelled to calculate the proportions of members by the aid of a text-book. The author appears to hope, also, that his work may have a tendency to discourage the use of empirical formulæ and rule-of-thumb methods, and to lead towards a standard and universal system of design. We really cannot see that this handbook is likely to do much good in the direction indicated, for its real motive is to suggest design by tables whose accuracy the user is asked to accept upon the assurance that "the treatment of the many phases entering the design has been carried out along well-known formulæ based upon the theory of elasticity, but modified by the usual assumptions, such as the 'conservation of planes' and 'Hooke's Law,' and not upon empirical formulæ based upon experiments." The reader is invited to take note of the fact that, before applying the theory of elasticity to any particular part of the design, "a sufficient number of tests were carried out along this basis to approve it, and determine the coefficients and constants." This further assurance is unsatisfactorily vague, and is not calculated to give confidence to practical designers. It is true that in Part II. results are given of two tests of beams, fifteen tests of a floor, and one test of a roof. We must point out, however, that no information is given as to the names of the persons by whom the tests were carried out, or the place where they were conducted. The beam tests may be useful as isolated examples, but are obviously insufficient as a basis of the extensive series of beam tables which the author hopes will supersede empirical formulæ and rule-of-thumb methods. The floor tests were carried out by some unnamed person, in some unknown place, on some unknown date, upon a concrete floor reinforced by an unknown proportion of steel rods. The total load in each case is stated with regard to sections of the floor indicated by figures and letters, but which cannot be identified because no plan is given, and a further mysterious element is that the total loads are stated in "square feet" and "lineal feet." Probably the author meant to express the loads in pounds per square foot, and pounds per lineal foot, but there is nothing in the tabular results to show whether the loads were in pounds, hundredweights, or tons. The results of the roof test also are rendered practically useless because no details of the construction are given. Part II. is concluded by three diagrams on which the results of various tests, for which no authority is given, are plotted, showing the relation between expansion and temperature, and indicating the coefficient of expansion for concrete at 0·00000642, which agrees approximately with the generally accepted value.

From the evidence here presented we are scarcely prepared to accept the view of the author that the contents of Part II. can be regarded as "justifying the use of various constants and coefficients in preparing the tables under Part III." We presume the foregoing words are intended to convey the meaning "justifying the values of the various constants and coefficients that have been adopted by the author in calculating the tables in Part III." As printed, they obviously mean something quite different, and in common with many of the explanatory remarks by the author show a lack of facility in the use of language which detracts in no inconsiderable measure from the practical utility of the volume to busy men. Part III. contains seven voluminous tables, from which it is said that the dimensions and proportions of reinforced concrete beams for any bending moment can be picked out. For instance, in using Table I., when the bending moment is known, the next higher value is picked out in the proper column, according as a factor of safety of 3·5 or 5 is required. On the same horizontal line of the table will be found the external dimensions of the beam, the area of steel, and the number and size of the bars into which the steel should be divided. In passing, we may point out that in the author's explanation on p. 76, column 5 is wrongly quoted, instead of column 9, as that in which will be found the area of steel in tension.

On p. 80 the author gives what he calls the "routine" by which the safe allowable resisting moments, both of compression and of tension, were deduced. Unfortunately, the method of computation is based upon an entire misconception of the mechanical principles governing the design of beams, and for this reason the tables are worse than useless. The author's views upon shear are equally fallacious, and their application totally invalidates the series of tables intended as a guide to the proportions of reinforcement for resisting shearing stresses. Moreover, it is not clearly stated at the top of the tables that all the dimensions relate only to 1 :2 :4 or 1 :1½ :3 concrete, which is assumed to have an ultimate compressive strength of 3,000 lb. per square inch, and that with the factors of safety employed the proportions given in the tables involve the extreme fibre stresses of 850 lb. and 600 lb. per square inch respectively for concrete compression. Tables IA and IB relating to continuous beams are calculated entirely for the extreme fibre stress of 850 lb. per square inch for concrete in compression, and this fact is not clearly stated at the top of the tables as it should be. The same objections apply to Tables II. and IV.

Other tables given in Part III. relate to the proportions of floor slabs and columns. The tables relating to floors are based on the same fundamental errors which were made the foundation of the tables of beams, and the table of columns is calculated upon data which the author has not made public.

From the foregoing comments it will be seen that these tables are not only unreliable, but, on the author's own showing, they involve stresses which are not compatible with prudent design.

A series of tables similar to these, if calculated by some well-known authority, in accordance with generally approved formulæ, and with constants and stresses such as are adopted in safe practice, would be of considerable assistance in the design of beams, floors, and columns. Even then the tables ought to be accompanied by clearly-worked examples showing completely the manner in which each was calculated to enable the designer to satisfy himself as to the accuracy of the proportions given, and all necessary data ought to be printed at the top of each table so as to obviate all risk of misunderstanding on the part of occasional users.

However, we are strongly of opinion that complete structures in reinforced concrete cannot be satisfactorily designed by any tabular method. The various members of a complex structure are so interdependent that they cannot properly be considered as absolutely separate units. If they were so treated by designers, relying solely upon tables, we feel sure that the effect upon reinforced concrete construction would not be, as suggested by the author of this work, to "remove some of the prejudicial influences at work tending to demerit its worth because of unfamiliarity with its design."

So far as this handbook is concerned, we can only express the hope that its sale in this country will not be large enough to do much harm, and the regret that a responsible firm of British publishers should have been advised to undertake its publication.

The Annual of the British School at Athens. No. XI.—Session 1904-1905. (London: Macmillan. 1*l.* 1s. net.)

THE latest *Annual* of the British School at Athens is exceptionally full of things of various interest. As a result perhaps of the School excavations at Palaikastro, in Crete, merging into those at Laconia, in Sparta—the latest field of research—we have no fewer than fifteen separate subject articles, which, with their subdivisions, really amount to twenty-four. Dr. Arthur Evans is given the place of honour for his brief account of the preceding season's work at Knossos, describing further researches in the outlying part of the Minoan paved-way leading west from the palace, some constructional discoveries in the palace itself, and the important restoration of the Hall of the Colonnades rendered necessary by a collapse. The plan given on p. 9 would be the better for a north point to aid the description.

Further on in the volume there is an exhaustive article by Dr. Mackenzie on "Cretan Palaces" dealing with certain theories of construction recently advanced by Dr. Dörpfeld and Professor Noack. We have no doubt that Dr. Mackenzie is right in his conclusions. His theme is to be continued, we are glad to say.

The School work proper is dealt with in a series of articles on Palaikastro and Laconia, which record an active campaign, principally a tabulation and arrangement of small data, thoroughly and carefully done. It does not make showy publication, but it works the evidence to the bone, as is imperative in modern methods of research. Mr. R. M. Dawkins (the newly-appointed Director) is chief contributor.

There are other articles of more general character, and we are glad to see that the topographical element is not entirely neglected. Mr. Hasluck edits "Dr. Covel's Notes on Galata" (1669-1677) with a useful explanatory note, and Mr. Dawkins contributes "A Visit to Skyros," which should prove interesting to the general reader as well as to specialists; but we should have liked a section or photograph of the church which he illustrates by plan. Mr. A. J. B. Wace has an interesting article on "Frankish Sculptures at Parori and Geraki," illustrated by photographs, under the heading "Laconia," and Mr. R. C. Bosanquet (retiring Director) writes on the Temple of Dictæan Zeus, etc., at Palaikastro.

There are other articles too numerous to mention. The most important plate at the end of the volume is the plan of Phæstos illustrating Dr. Mackenzie's article, the first complete plan of Phæstos yet published in an English journal; it is regrettable that the figures on the plate are so small, making comparison with the text difficult. There is also a coloured plate of a fine early vase from Knossos and other plates showing a map of Constantinople in the XVIth century, an archaic relief from Angelona, two Greek busts, a view of the State entrance at Phæstos, a view of the ninth magazine at Knossos, Neolithic objects from Magasá, a key-plan of the town of Palaikastro, detailed plan and section of the temple site, plans of early and late walling, with photos, and a terra-cotta relief and fine bronze shield, all from the same site.

The volume is also illustrated by numerous cuts in the text.

London Topographical Record. Vol. III. (Chiswick Press, and Clifford's-inn, E.C. 1906.)

THIS volume, issued for the years 1903-4 by the London Topographical Society, contains their fifth and sixth annual reports, with addresses from the chair and proceedings, and three articles—by Mr. F. G. Hilton Price, Dir.S.A., upon the "Signs of Old London," a subject he has made particularly his own; by Mr. J. G. Head, F.S.I., upon "Alterations in North Saint Marylebone"; and by Colonel W. F. Prideaux, C.S.I., upon "Salway's Plan of the Road from Hyde Park Corner to Counter's Bridge" (Fulham boundary). On March 18, 1899, we printed an account of Joseph Salway's unique survey, extending over about fifty sheets, all dated in June, 1811, made by him when surveyor to the Kensington, etc., Turnpike Trust, and deposited in the British Museum. The drawings have since been reproduced in a most admirable form by the Society. Colonel Prideaux's "Notes" are just what one would look for from the hands of a so painstaking and accurate expositor. In his address (1904) upon relics and vestiges of old London, and his paper upon XVIth-XVIIIth century signs in and around St. Paul's Churchyard, Mr. Hilton Price discourses in his wonted easy and attractive style, giving relief and animation to the theme; he contributes many valuable particulars concerning the traders themselves, their tokens, publications, and wares, with illustrations of tickets, bill-heads, etc. Mr. Head, a well-known estate agent and surveyor practising in the Borough, recounts the manifold changes which have occurred during fifteen years past under his own observation in the St. John's Wood and adjoining districts consequently upon the construction of the Great Central and other railways and of electrical lighting works. More than 70 acres of house property belonging to Lord Portman and the Eyre Estate trustees have been quite transformed between Marylebone-road and Lord's cricket-ground. Mr. Head adds a shaded general plan and photographs and plans of some of the demolished houses and their gardens—amongst them being the homes of George Eliot (three), Mrs. Siddons, Huxley, Tyndall, Sterndale Bennett, Edwin Landseer, Kossuth, and Mary Lamb. The north block of Bickenhall-mansions, we may observe, supplanted in 1896-7 York-buildings, where at No. 8 (afterwards No. 77, Marylebone-road) Leigh Hunt lived in 1817-20. The Society has lately been reconstituted upon a greatly improved and liberal basis; this volume and its predecessors evince that the conductors highly appreciate the scope and variety of their aims, and how those aims may be best attained. It is gratifying, too, to find the names of eminent architects upon the Council, and that the members include many public libraries and institutions at home and abroad, as well as several American universities. Their publications are ably edited by Mr. T. Fairman Ordish, F.S.A., who has been a chief collaborator since the founding of the Society twenty-six years ago.

British Rainfall, 1905. By HUGH ROBERT MILL. (London: Edward Stanford. 1906.)

AT the present moment people in general are far more concerned at the lack of rain in 1906 than about the rainfall that took place in the preceding year, although, even to the average man in these parched days, we may recommend this volume as a refreshing study. To engineers and authorities upon whom devolves the duty of finding and providing supplies of water for public and industrial purposes or who have occasion to deal with the drainage of land the book possesses a distinct value as a standard work of reference and comparison.

The work conducted by the British Rainfall Organisation—of which Dr. Mill is the moving spirit—is entirely unofficial, and constitutes one among many undertakings of national character that are left by the State to private enterprise. The position is quite different in Germany, where rainfall observations and the compilation of results are undertaken by the officials of public departments. Thanks to the voluntary work performed by some 4,000 observers in the United Kingdom comparatively few areas of considerable extent are unrepresented, and the observations rendered available constitute a most useful record, as abundantly evidenced by the yearly volume produced by Dr. Mill.

Part I. of the present issue contains two original articles—one giving an interesting account of the remarkable compendium of rainfall statistics prepared by Professor Hellmann, of the Royal Prussian Meteorological Institute, and the other dealing with the relation of evaporation to other meteorological phenomena. As the extent to which evaporation takes place largely governs the amount of water available for use it is a matter for regret that only eleven stations in the British Isles are equipped with tanks for the collection of data. In Part II. will be found notes from observers on the rainfall and weather generally, records relative to heavy falls of rain and their distribution over the country, similar data concerning the distribution of rainfall in time, a classification of rainy days, drought, and spells of rain, and the usual comprehensive tables of annual and monthly rainfall.

Reference to records shows that since 1891 the general rainfall of the British Isles has been comparatively heavy one year and much lighter for the two next years. This sequence cannot reasonably be regarded as a permanent institution, and, as Dr. Mill justly points out, "a grievous disappointment must be in store for anyone who is rash enough to make definite forecasts based upon the recurrence of the past fifteen years." In fact, it is not improbable that 1906 will prove to be an exception to the rule. So far as last year is concerned, the general rainfall in England and Wales was 16 per cent. below the average for the past twenty-five years, and, with the exception of 1902 and 1893, there has not been so dry a year since the memorable drought of 1887.

While the work of the British Rainfall Organisation is in no way prophetic the information collected is indispensable to all who have occasion to inquire into the probable supplies of water available, and the volume now published is one of a series whose obvious merits require no commendation on our part. The only unsatisfactory feature connected with it is that the cost of maintaining the Organisation is greater than the income derived from subscriptions and the sale of publications. So great a national work ought clearly to be placed upon a more secure financial basis.

BOOK RECEIVED.

ATTRITION TESTS OF ROAD-MAKING STONES. By J. Lovegrove. (The St. Bride's Press. 5s.)

Fifty Years Ago.

FROM THE *Builder* OF SEPTEMBER 13, 1856.

DANGEROUS AND INSANITARY HOUSES.—Little Swan-alley, where fell the house that proved a grave for four poor creatures last week, is a few paces out of the fine thoroughfare Moorgate-street, and a very short distance from the region of gold, Lothbury. The alley is about *seven feet* wide, with houses on both sides, all in a miserable condition, dangerous alike in a structural and a sanitary point of view. The house that fell was at the back of the houses on the north side of the alley. It was a mere heap of rubbish. The tenants were advised at different times to leave it, but, as one of them said at the inquest, in words we have often recorded before, she would gladly have done so if she could; but she had a large family, and it was very difficult to get reasonable lodgings in the neighbourhood, and so she would take the chance. The coroner, after summing up the evidence that had been given, pointed out that it was the duty of the jury to inquire if there had been that culpable neglect on the part of any persons which would make them criminally responsible; whether there had been omission amounting to culpable neglect on the part of those who had charge of surveying the district, or of any other person. If they were of that opinion, they must say who were to blame, and it would be their duty to return a verdict of manslaughter against him or them; or, if they did not feel justified in coming to that conclusion, then they must say it was an accidental occurrence. The jury, after deliberating for some time, returned the following verdict:—"Accidental death from suffocation by the falling of the house, No. 9, Little Swan-alley," accompanied by the following recommendation:—"The jury earnestly recommend to the Commissioners of Sewers that they would authorise a special survey forthwith to be made of all the buildings, in the city of London, that from age or other cause may be supposed to be out of substantial repair." It is to be hoped that this recommendation will be attended to immediately, as there are houses around the site of the recent accident, without going farther, in an imminently dangerous state. There are houses in Blue-Hart-court and Bell-alley (we would especially instance No. 4, in the latter place, that looks as if it might come down at any moment), which should have immediate attention. In New-court, although more decent in aspect externally, the fronts overhang very considerably. In a sanitary point of view, air and light are sadly needed in this nest of alleys. We can remember when it was much worse, it is true—when the tenants had no water, and every house was a reeking fever-still. It is bad enough, however, even now. In one of the houses that we entered, the smell was perfectly overpowering, and in many the cadaverous aspect of the occupants shows the degradation of the vital powers. Let us hope that out of evil may come good.

Illustrations.

CAXTON HOUSE, WESTMINSTER.

THIS large block of buildings has recently been completed in Tothill-street, Westminster, on the site immediately west of that on which the new Wesleyan Hall will be erected. Mr. J. S. Gibson is the architect.

We had asked Mr. Gibson for illustrations of the building, and in addition to photographs of the exterior he kindly sent a large-scale detailed and figured elevation, with a section of the front wall. This we have reproduced on a plate larger than our usual size, more especially for the benefit of our younger student readers, to whom a working drawing of this kind, by an experienced architect, should be of considerable practical value for study.

The following is the architect's description of the building:—

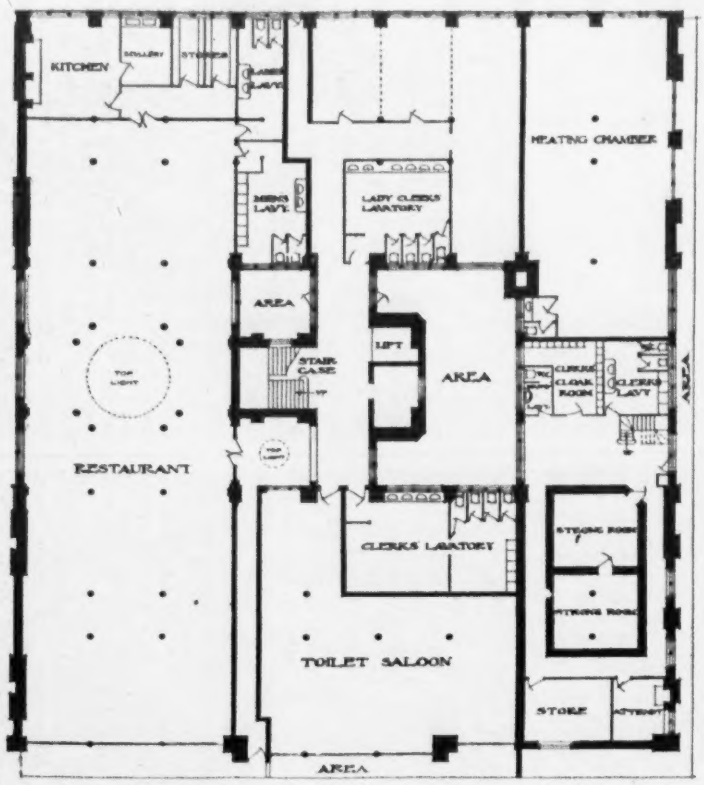
"This large block of buildings has been erected on part of the site formerly occupied by the Royal Aquarium, in Tothill-street, Westminster, and, as shown by the plans, it has been designed as a purely business structure.

The first consideration was the necessity of plenty of light and air to all the offices and easy and direct access to all parts. The exterior walls are built to comply with the Building Act, and the whole of the interior of the building on the upper floors has been left to be divided up by partitions to suit the requirements of the various tenants. It might be thought that the "double" corridor type of plan adopted would be dark, but, as the partitions forming the corridors are glazed from about 7 ft. high to the ceiling, every floor is remarkably light and cheerful, and for such large blocks of buildings I think this type of plan will be often used.

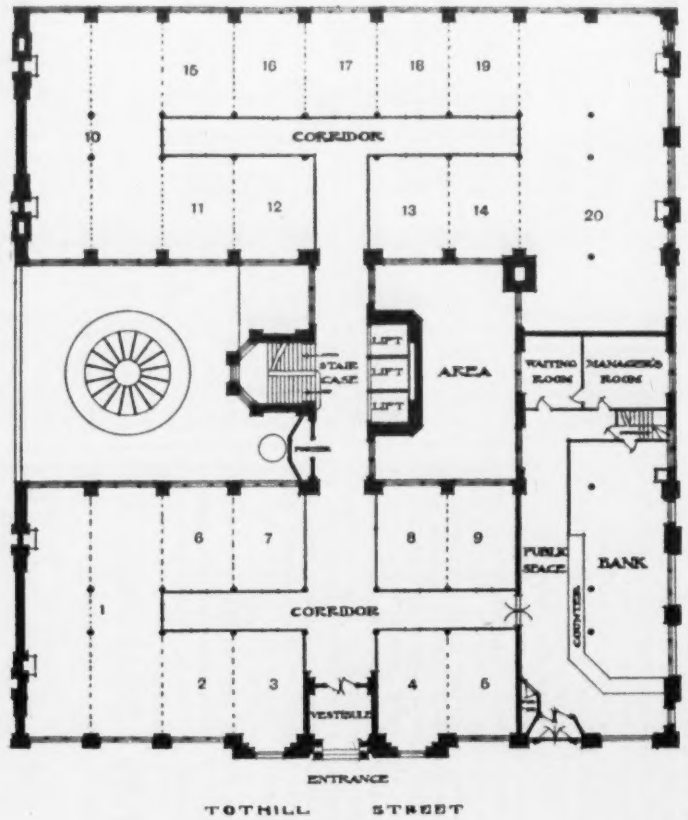
In preparing the foundations the old concrete foundations of the Aquarium gave some trouble, and these had to be removed by blasting. The subsoil was of so soft a nature that the whole building was placed on a concrete raft, which has made an admirable foundation.

The three lower floors are entirely of skeleton steel construction, the upper floors having the external walls built to take the weights without the aid of steel stanchions, as will be seen by reference to the detail drawing. All the floors and roofs are steel encased in coke-breeze concrete, the flat roofs covered with asphalt and the sloping roofs with green slates. The whole of the surfaces of the office floors are treated in a rather novel manner, as they are finished with granolithic covered with linoleum, and so no wood floors are used in any part of the building. I used this method in some smaller blocks of office buildings in the City, and, as it seemed to be liked by the tenants, the same method of finishing these floors was adopted here with success.

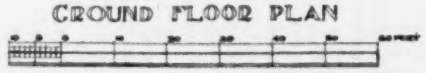
On the basement floor is a large restaurant,

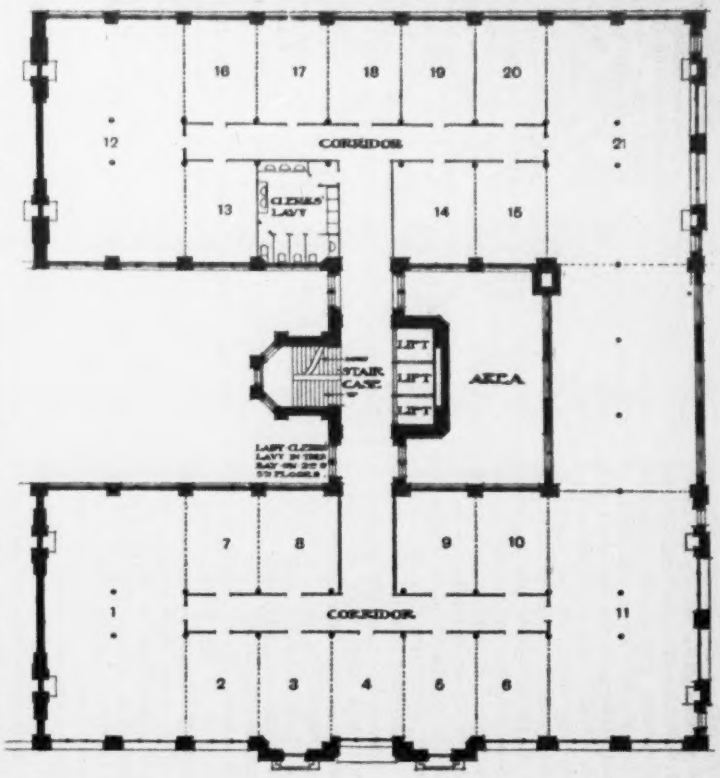


BASEMENT · PLAN



GROUND FLOOR PLAN





FIRST · FLOOR · PLAN

Carton House, Westminster, Plans.

with access from Tothill-street as well as the interior of the buildings; all the heating and ventilating plant are here, the building being heated by atmospheric steam, and every office is provided with an independent radiator, very few fireplaces being used.

On the ground floor the east corner has been designed for a bank, and the remainder as offices in suites of any size. The entrance-hall contains three electric passenger lifts by Messrs. Smith & Stevens, two lifts stopping at every floor level and travelling about 150 ft. per minute, and one express lift, travelling at 250 ft. per minute, serving the upper floors. A letter-shoot is provided in the central hall on every floor, the letters being collected by the Post-Office authorities at the ground-floor level. Provision has been made for telephone and electric lighting to be placed in any office without disturbing the structure or decorations of the building.

The whole of the entrance-hall and stairs have been admirably executed in "Stoneville" by Mr. Gilbert Seale, who also executed the fibrous plaster decorations of the restaurant, the scagliola columns being by Messrs. Bellman & Ivey.

The front of the building to Tothill-street is of Bath stone of a good colour and texture, which promises to weather very well. The east elevation is of stone and brick, and will be partially masked by the new Wesleyan Hall, now being erected from the designs of my friends, Messrs. Lanchester & Richards.

Rather a novel feature is the use of wood casements for all windows, which are hung to open out in the ordinary way for ventilation, and also to open inwards for the purposes of cleaning.

The elevations as shown on the views must be considered as only a part of the whole composition, as the building now erected is only one-half of the whole scheme.

The remaining half to the west will be begun early next year, and the effect of the front will then be different to what it is at present.

The general contractors for the whole scheme were Messrs. Holloway Brothers, who have carried out the works in an excellent manner.

In the *Builder* for January 6, 1906, is a criticism of this building, the spirit of which I appreciate, and with many of the opinions therein expressed I agree. But in justice to the architect it must be remembered that this is a utilitarian building, treated as simply as possible architecturally.

The necessity for an abundance of light has left its mark on the design. I think the entrance doorway and the oriel over would have been the most interesting feature of the whole building had they been carried out with the caryatide figures supporting the oriel window, as originally designed, but these features had to be swept away and the somewhat meaningless shield put in their place."

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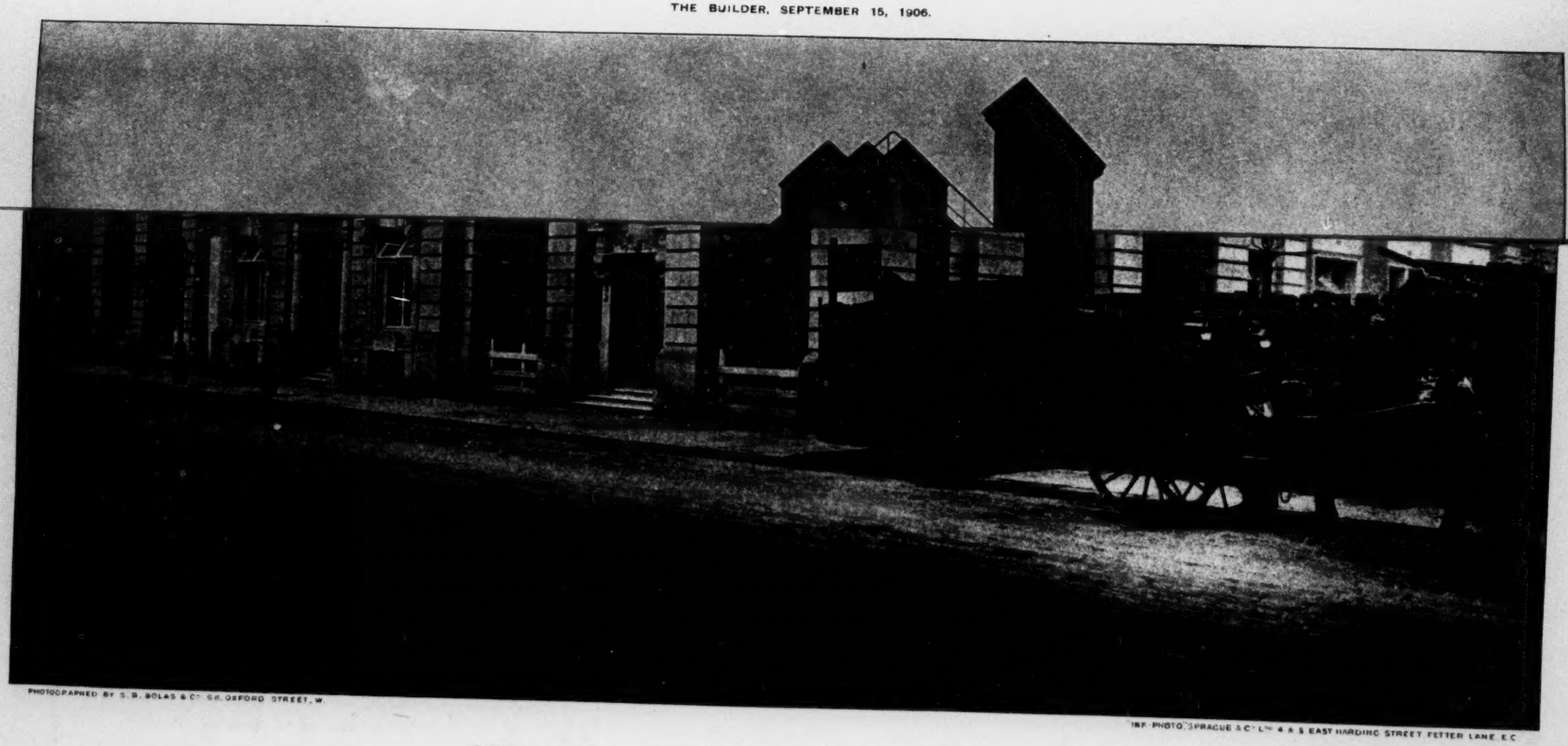
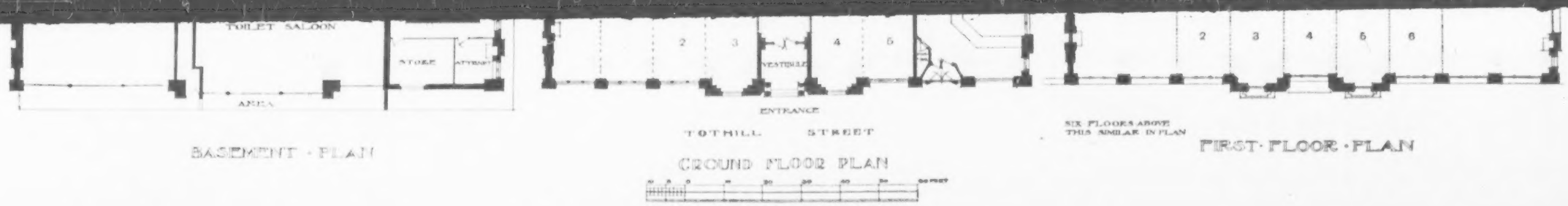


PHOTOGRAPHED BY S. B. BOLAS & Co 66, OXFORD STREET, W.

INK PHOTO SPRAGUE & Co LTD 4 & 5 EAST HARDING STREET FETTER LANE E.C.

CAXTON HOUSE, WESTMINSTER.—Mr. J. S. Gibson, F.R.I.B.A., Architect.

GENERAL VIEW.



Carlton House, Westminster, Plans.

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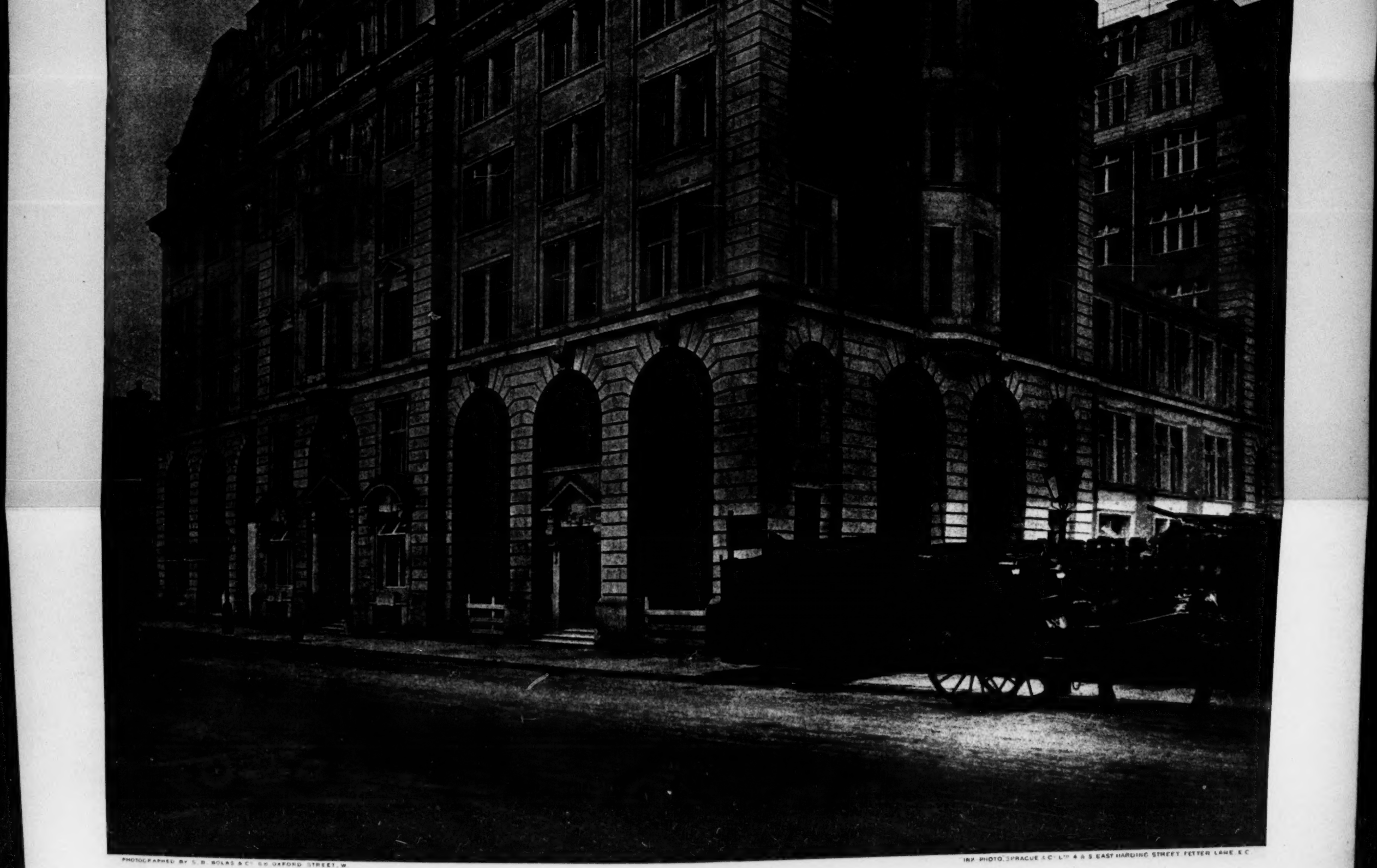


PHOTOGRAPHED BY S. B. BOLAS & Co 66 OXFORD STREET, W

REP. PHOTO. SPRAGUE & Co LTD 4 & 5 EAST HARDING STREET FETTER LANE E.C.

CAXTON HOUSE, WESTMINSTER.—Mr. J. S. Gibson, F.R.I.B.A., Architect.

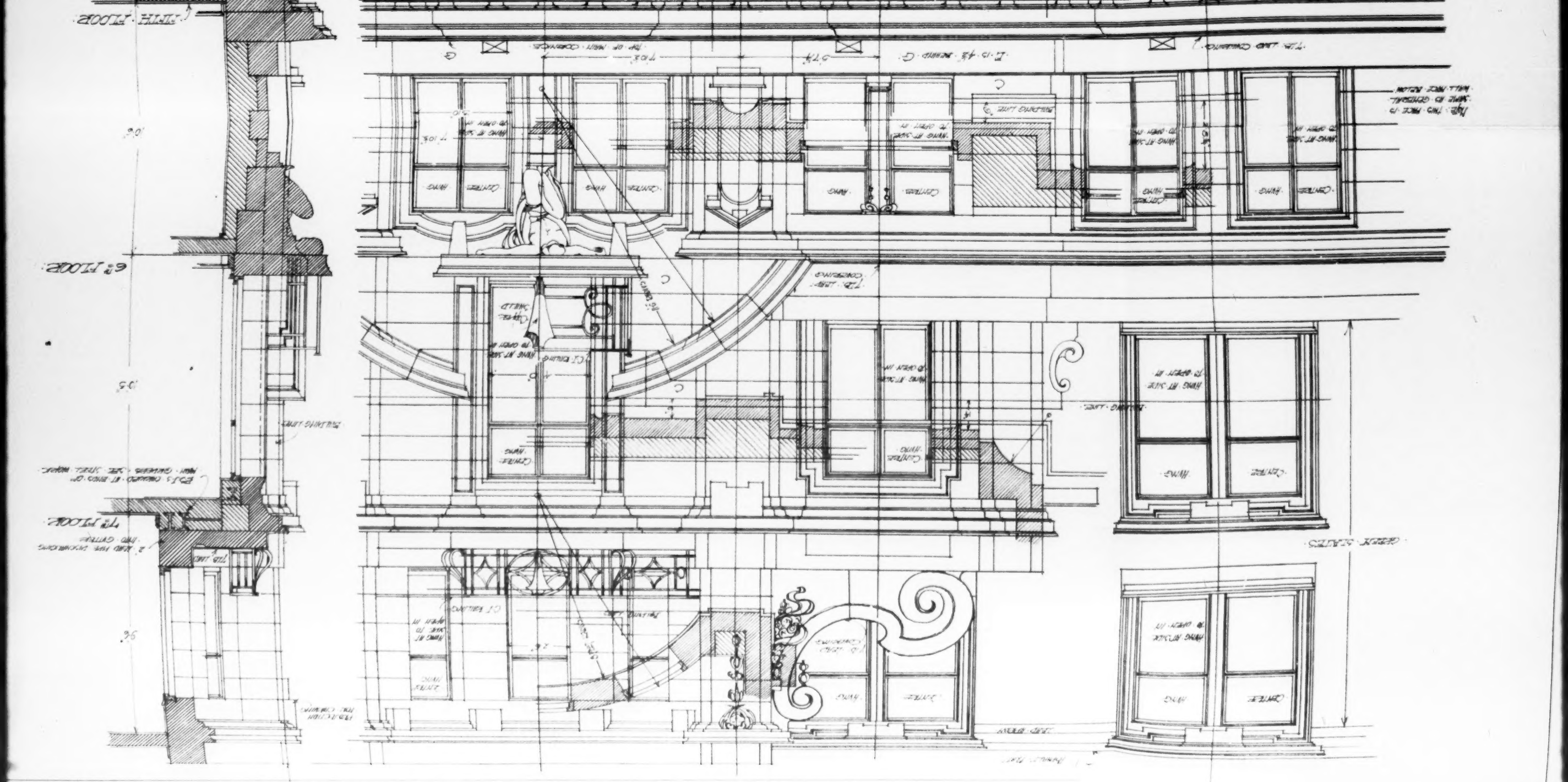
GENERAL VIEW.

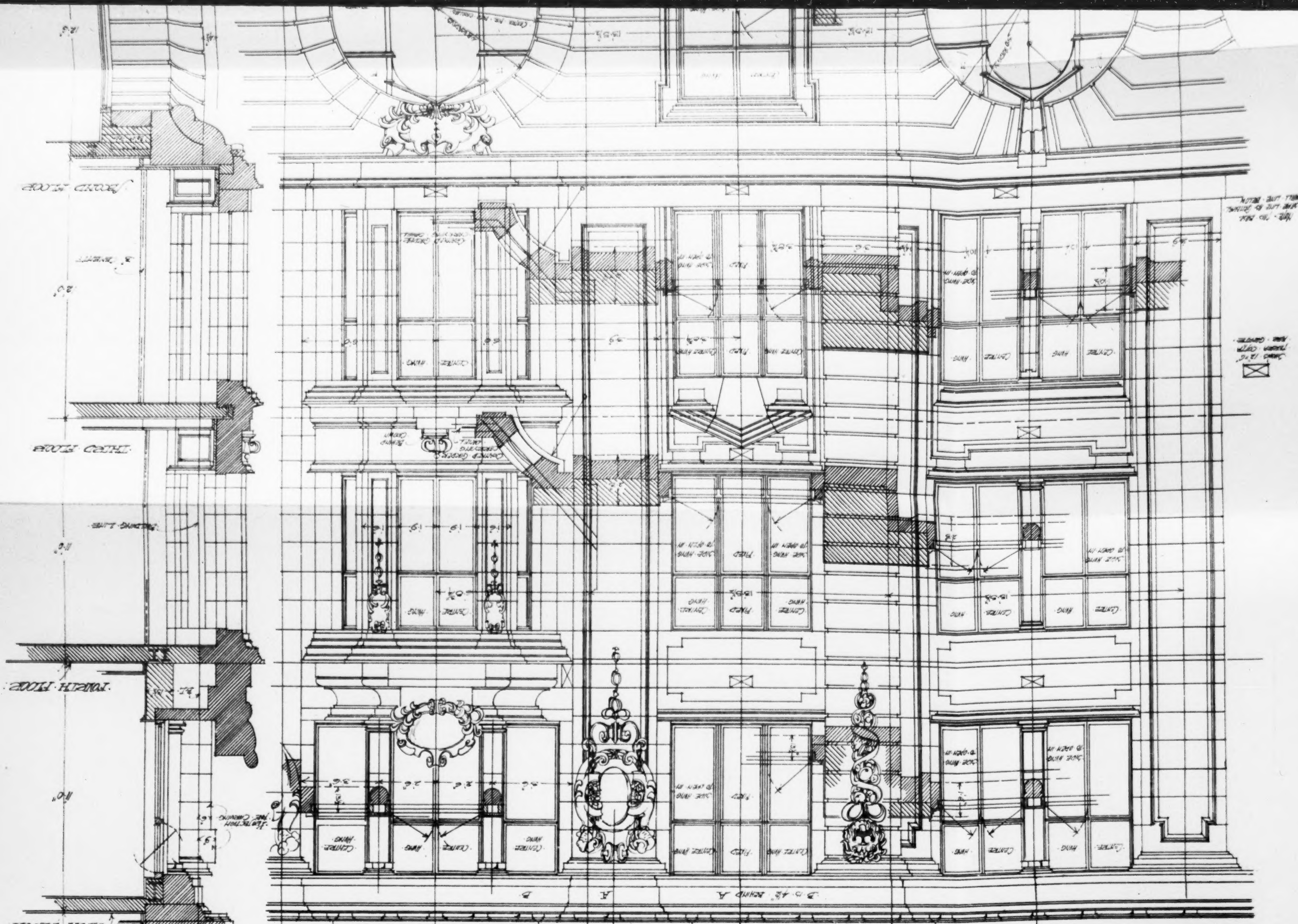
PHOTOGRAPHED BY S. B. BOLAS & Co. 66, OXFORD STREET, W.

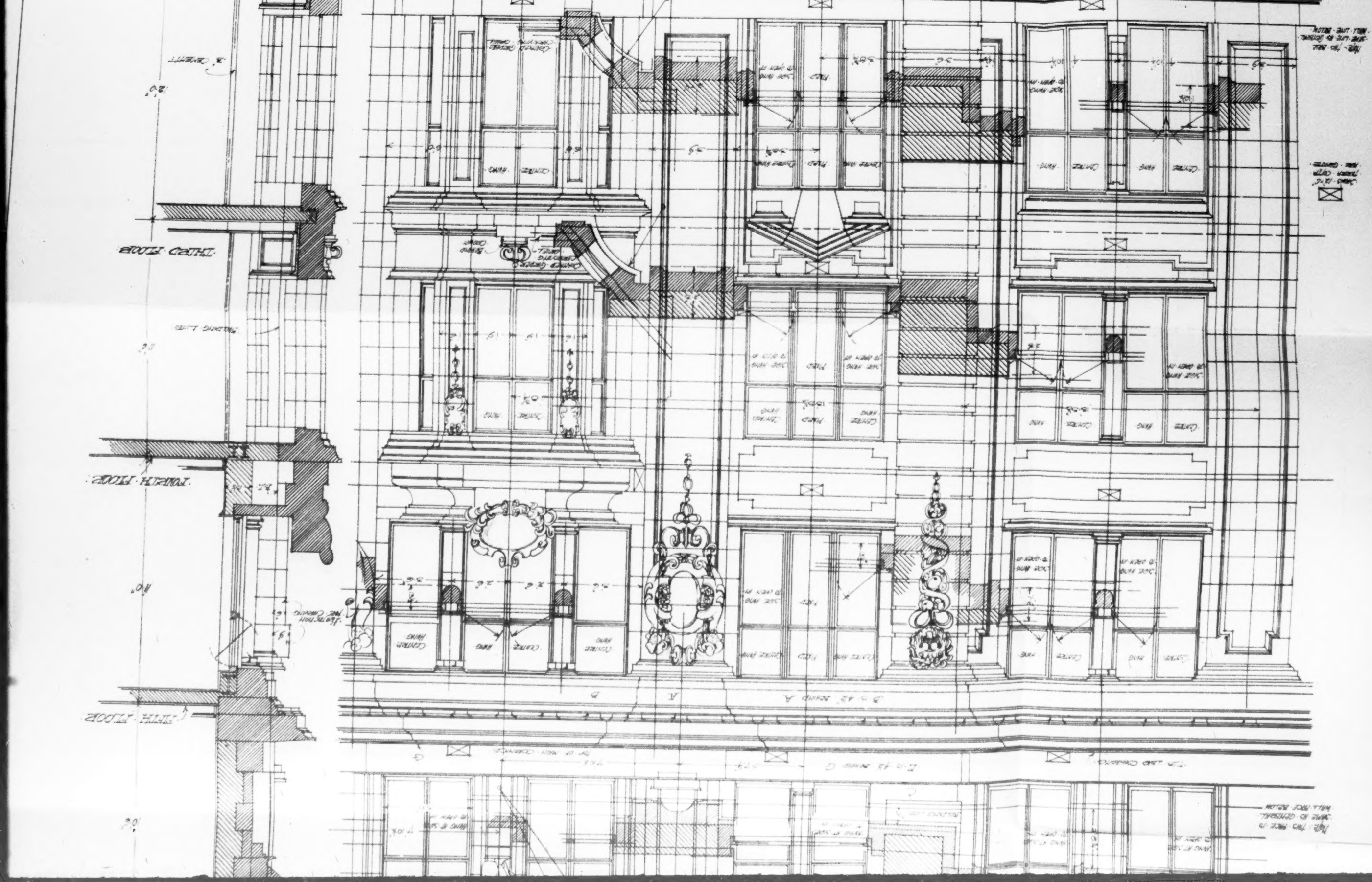
INK-PHOTO SPRAGUE & Co. L.d 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

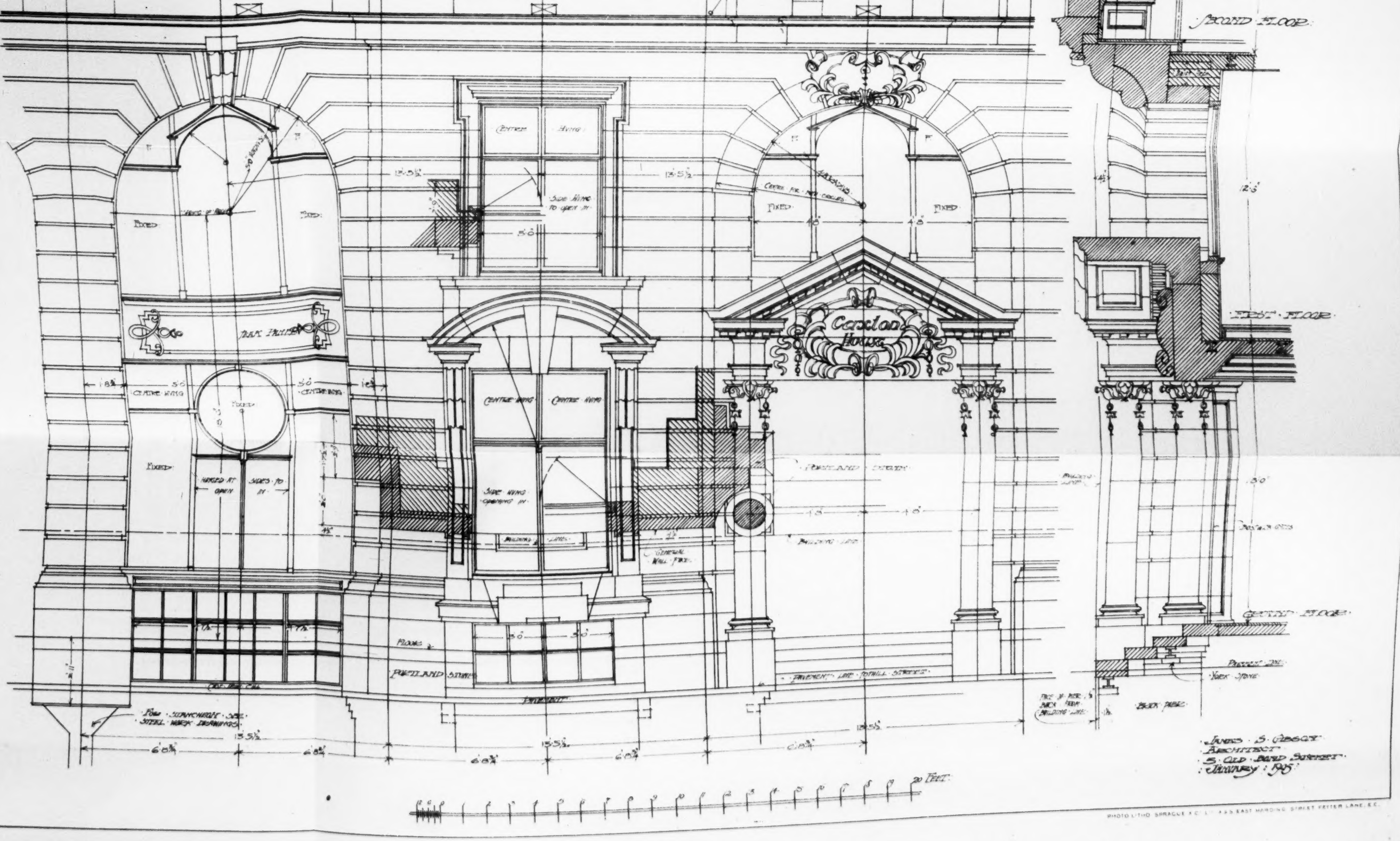
CAXTON HOUSE, WESTMINSTER.—Mr. J. S. Gibson, F.R.I.B.A., Architect.

CENTRE PORTION OF FRONT TO TOTHILL STREET.









CAXTON HOUSE, WESTMINSTER.—Mr. J. S. Gibson, F.R.I.B.A., Architect.

DETAIL ELEVATION AND SECTION OF FRONT.

PHOTO LITHO SPRAGUE & C° LTD 4 & 5 EAST HARDING STREET FETTER LANE E.C.

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Trade Catalogues.

We have received from "Simplex Conduits, Ltd.," of Queen Victoria-street, a leaflet describing three additional accessories they are making. The first consists of a very cheap watertight lampholder made of galvanised steel, which ought to be useful for electric lighting in damp situations. The second of a cheap ceiling-rose fitting, and the third of a novel wall-fastener. In our opinion this wall-fastener will in many cases dispense with the necessity of plugging the walls, and so will greatly facilitate the installing of the conduit system.

Messrs. Newton, Chambers, & Co., of Thorncliffe Ironworks, near Sheffield, send us a pamphlet containing illustrations and full dimensions of standard plates for cast-iron tanks, with all flanges inside. In addition to ordinary square and oblong plates varying in size from 3 ft. to 5 ft. square and from 3 ft. by 2 ft. 6 in. to 5 ft. by 4 ft. 6 in., special plates are made for bottom and outside corners and for inlets and outlets. The thickness of the plates ranges from $\frac{3}{8}$ in. to $\frac{7}{8}$ in., and by suitable selection a tank of any given capacity can be built up. The flanges are machined square along their full width with the tool-cuts running in the longitudinal direction, thus forming fine ridges that help to retain the jointing material in position. In succeeding pages of the pamphlet diagrams are given of thirty tanks built up of standard plates, the capacities being from 675 gals. to 25,000 gals. In these diagrams the distinctive number and thickness of each plate is stated, but no information is given as to the diameter and pitch of the bolts or to the position and diameter of the tie-rods. The makers naturally leave such points to the designer, although if desired they will settle them for customers. So far as architects are concerned it is desirable, of course, that calculations of the kind involved should be made independently of the makers, but the new standards for plates will be found of great convenience, besides insuring speedy delivery and avoiding the unnecessary cost sometimes caused by the making of patterns for plates of special sizes.

The Hoisting Appliances Company send us an abridged catalogue giving particulars of hoisting tackle, some forms of which are both novel and ingenious. For instance, Pickering's "Excelsior" safety landing-hoist for warehouses is a neat arrangement, taking up no floor space and necessitating no structural alterations. It comprises a movable gantry running on rollers in a horizontal direction, and arranged so that it can be moved quite easily, being drawn out for hoisting or lowering goods between the ground and the upper story of a building, and drawn in for lifting goods from or depositing them upon the floor over which the hoist is fitted. This seems to be a very handy appliance for places where headroom is limited; the cathead does not project when not in use; the hoist is a tenant's fixture, and can be erected without municipal authority. The same type hoist is equally suitable for operation through a loophole, a window, or over a well-hole. The "Coburn" trolley track, for transferring goods from one workshop to another in industrial establishments or warehouses, is a novel form of overhead tramway. The hoist-carrier runs in a rounded groove, the form of which materially assists its movement; the wheels are fitted with roller bearings, and the load can be taken with perfect ease round curves of small radius. The "Handyman" portable crane comprises a steel arm, with a radius of 3 ft. 3 in., mounted upon a steel frame, and provided with hand-hoisting gear. The 30-cwt. size is 8 ft. high, and lifts the load 6 ft. 6 in. A good selection of other more or less familiar types of light hoisting machinery is described in the catalogue.

Messrs. Joseph Sankey & Sons, of Bilston, send us a circular describing the main features of a new invention which they are placing upon the market, under the name of "Skeleton Steel" reinforcement, for the construction of concrete-steel lintels. The skeleton is stamped out of a single strip of metal, corrugated, and expanded in the form of a light girder, having two tension strips and one compression strip, the lower and upper members being connected by diagonal strips for resisting shear. Thus the skeleton is triangular in cross-section. This type of reinforcement is made in stock sizes from 3 ft. long, increasing by increments of 1 ft. up to 8 ft. long. Each skeleton is of suitable dimensions for a lintel 4½ in. wide, the depths recommended ranging from 6½ in. to 10½ in., according to the span. For lintels 9 in. wide two of the skeletons are to be embedded side by side. Similar reinforcement is supplied for walls, girders, floors, and roofs, the thickness of metal being proportioned by the makers according to requirement. It is claimed by the licensees that, as these special sections are formed in one piece each, they are superior to separate rods and stirrups. We grant that the secure connexion of the elements for withstanding tension, compression, and shear respectively is in itself an advantage. But the use of stereotyped reinforcement is not to be advised on principle. It does not provide for differences of loading, and tends to take away from the designer the opportunity of proportioning and arranging the steel in conformity with ascertained conditions. In the design of concrete-steel structures, however simple, the architect or engineer should invariably be guided by his personal knowledge of mechanical principles, and should not trust to adventitious aids. Like a patent medicine, skeleton steel may be permissible on occasion by those who know its capabilities and limitations. For the architect to rely upon this, or any other patented form of reinforcement, as a guide to scientific design would be as not less unwise than for a medical practitioner to adopt patent medicines instead of judiciously selected and compounded *materia medica*.

Mr. Carl Flohr, a German lift manufacturer with offices in London, sends us his catalogue of electric and hydraulic passenger and goods lifts. In the earlier pages of the book will be found descriptions and illustrations of various safety appliances, such as catch-devices and safety door-locks, which, as well as the electric push-button control, are applied to Flohr lifts. The bulk of the catalogue is devoted to photographic views illustrating numerous patterns of lifts fitted in private houses, hotels, public institutions, warehouses, manufactories, and railway sations on the Continent. There is also a photograph on p. 57 of a large building-material lift installed in a lofty tower on the site of the work to be executed. So far as we can judge by perspective views the mechanical equipment of these lifts seems to be of sound design. The structural and decorative features of the lifts are decidedly good so far as appearance affords any criterion.

Messrs. John Spencer, of Wednesbury, send us a sheet list of their wrought-iron tubes and fittings for gas, water, and steam, tubes and fittings for wells, boiler-tubes, solid-welded steel flange-tubes, sewer ventilating-shafts, and telegraph-poles. We do not find any statement as to whether the tubes and fittings mentioned in the catalogue are threaded in accordance with the British standard specification. It is very desirable that all tube-makers should work to a uniform standard, as the differences hitherto prevailing have caused unnecessary trouble to pipe-fitters.

LUNATIC ASYLUM BUILDINGS.

The Lunacy Commissioners in their annual report, just issued as a Parliamentary Blue Book, give detailed information as to new asylums in course of erection, sanctioned, or approved, as well as respecting alterations, additions, and improvements, temporary buildings, etc. In regard to the Essex second asylum (Colchester) they state that the preliminary plans of the reception block, idiots' block, consumptives' block, paying patients' pavilion, nurses' and attendants' blocks, chapel, farm buildings, and other detached buildings have now been settled. Particulars relating to the plans and estimated cost of the London County tenth asylum (Long Grove) have been already published. It is proposed to supply this asylum with electric current for lighting and power purposes from the central station which already supplies the Horton Asylum and the Epileptic Colony. It will, however, be necessary to enlarge the station and plant at an estimated outlay of 10,000*l*. Horton Farm, a farmstead on the Horton estate, is to be utilised for the purposes of the asylum, and the buildings, which had fallen into a bad state of repair, are to be renovated and made suitable at a cost of 1,010*l*. Satisfactory progress is being made with the second Worcestershire (Barnsley Hall) Asylum, which it is hoped may be ready for occupation before the close of this year. It has been decided to deal with the sewage bacteriologically, and the necessary works for this are estimated to cost 3,000*l*. Plans for the second portion of Storthes Hall Asylum have been approved. The estimated cost of this portion is 93,800*l*. New sanitary annexes are being erected in connexion with the private patients' block of Cornwall Asylum at a cost of 2,200*l*. Contracts amounting to 17,570*l*. have been approved for the erection of two additional blocks at North Wales Counties Asylum (Denbigh). At Hants Asylum a new house is to be built for the medical superintendent at a cost of 2,800*l*. A contract for carrying out various improvements and additions at the laundry of Barming Heath Asylum (Kent) and for erecting a small hospital for infectious cases has been sanctioned, the amount being 10,096*l*. Another contract, amounting to 9,760*l*., has also been approved for the erection of a new boiler-house and chimney shaft, the supply of two new steam boilers and for other works having for their object the increased protection of the patients and buildings against fire. At an estimated cost of 2,608*l*., and chiefly by the provision of modern sanitary arrangements, some more of the wards of the old Lancaster Asylum are to be improved. Plans of permanent wards to be built on the site of temporary blocks at Banstead Asylum have been approved. The new buildings will provide accommodation for 300 patients, and the cost of their erection, after making allowance for taking down the temporary blocks and utilising the fittings as far as possible, is placed at 30,763*l*. At Bexley Asylum a detached block is being erected for the reception and special treatment of fifty acute male patients in order that they may be placed under the most favourable conditions for recovery. The cost will be 12,142*l*. A range of twelve cottages is to be built for male attendants at Napsbury Asylum (Middlesex) at a cost of 2,900*l*. There is to be a new detached laundry, to cost 11,500*l*., at Northampton County Asylum. A new ward for fifty patients is to be added to Wilts Asylum at a cost of 4,638*l*. Contracts amounting to 1,543*l*. 10s. 10d. have been sanctioned for the erection of airing-court shelters, cart sheds, and a cricket pavilion, etc., at Croydon Borough Asylum. The pressure on the existing accommodation in Hull City Asylum has been so great that it has been decided to provide additional wards by placing another floor on the existing one-storied buildings. These extensions are estimated to cost 19,950*l*. The female division of Norwich City Asylum having proved insufficient it has been decided to expend the sum of 9,000*l*. in providing additional wards and making other improvements. At Nottingham City Asylum the temporary dormitory for forty female patients erected in 1898 to relieve overcrowding pending the completion of the permanent buildings is now to be replaced by an ordinary brick building to cost 3,000*l*. The Commissioners have prepared a return, by order of the House of Commons, respecting the cost of buildings per head, etc., but they point out that in many of the newer asylums administrative buildings have been erected largely in excess of present requirements with a view to future enlargement, which will be able to be effected at a much lower rate than the cost per bed given in the return, and will, of course, still further reduce the average. The Commissioners observe, in conclusion: "The variations shown in the cost of asylums have been to some extent the result of several obvious causes. Some of them were built when the prices of building were comparatively low; others at periods of special inflation of prices. The size, cost, and character of the site, and the high price of land obliged to be purchased for subsequent enlargement in the districts which have become urban; the distance from the source of supply of the building materials, and consequent expense of carriage; the complete initial construction of roads in some but not in all cases; the equipment of the asylum in respect of new farm buildings, means of lighting, water supply, and disposal of sewage, as against adequate farm buildings already on the estate, adjacent public gas, electricity, water supply, and drainage facilities available; elaborate systems of heating and ventilation as against open fireplaces and natural means only; the introduction of the block system of asylum construction and the provision of intercommunicating corridors to secure facility of administration; the provision of ample cottage accommodation for staff, rendered necessary by remoteness from towns and the absence of rentable buildings; the extensive use of glazed brick dados and other wall facings, costly as capital expenditure, but labour and cost-saving in subsequent administration; the introduction of unnecessarily expensive fittings and appointments after the approval of the plans in which no indication of their intended use appeared; the architects' fees, saved in many instances by the employment of the county or borough surveyor, who is otherwise remunerated for his services; and the specific enforcement, in some contracts, upon contractors of the trades union regulations and rates of wages—these may all be mentioned as important factors in the differentiation of cost."

Apart from these considerations the return exhibits the average cost per bed of buildings and land in county and borough asylums at 223*l*. 11s. 9d.

The Student's Column.

ROOFS: STRUCTURALLY CONSIDERED.—IX.

16.—*Loads on Roofs.*

THE loads that have to be supported by roof structures are of two main classes:—

(*a*) Permanent loads.
(*b*) Occasional loads.

(*a*) *Permanent Loads* include the weight of the roof covering and framework, and in some cases the weight of lanterns, ceilings, and other structural or architectural details, not strictly forming part of the framework proper.

All such loads are constant, and invariably act in a vertical direction, but there is another class of load for which provision has often to be made, namely, live loads, due to machinery connected with, or suspended from, the roof framework. In the present article we confine attention, so far as permanent loads are concerned, to the weight of roof covering, leaving the weight of roof principals and other parts of the framework to be discussed hereafter.

The weight of the permanent load represented by roof covering is calculated from the quantities and weight of the materials employed, the square of 100 super. ft. being the accepted unit of measurement because it permits the accurate computation of laths, battens, tiles, slates, and other materials which could not be taken into account conveniently if weights were calculated for a small unit such as the square foot.

Nevertheless, as in the design of roof structures it is usual to reckon permanent and other loads per square foot, the weights calculated per square should be reduced for reference to the smaller unit of measurement. As this merely involves the movement of the decimal point two places to the left, practically no trouble is thereby occasioned.

In paragraphs 5 to 15 we have already stated the weights of various covering materials per square, and it is an easy matter to reduce these to weights per square foot. But the results so obtained will not represent the total weight of the covering, for nails, bolts, laths, boarding, sheathing, mortar, putty, and other incidentals applied to the fixing of the covering have also to be considered.

As the weights per square of various coverings vary considerably, and as there are available numerous alternative methods of laying the different materials, it would be a laborious task to calculate weights per square foot for every possible combination, even for the most generally used materials, and the results would constitute a formidable series of tables, far too extensive for inclusion in the present article.

While the exact value of the permanent load, so far as that is represented by the covering, should always be calculated for roofs of given design, it is very convenient to have at hand a table stating average weights that can be used for approximate estimates and preliminary designs.

Table XIX. contains approximate weights for various roof coverings.

The weight of roof covering is usually estimated in pounds per square foot of roof surface, but sometimes the weight is taken on the basis of pounds per square foot of ground area covered by the roof.

In the latter case the weight varies with the pitch of the roof, and may be calculated from the weight per foot of roof surface by the aid of the simple trigonometrical rule that the base of a triangle is equal to the hypotenuse multiplied by the cosine of the angle subtended by the two sides in question, or

$$base = hyp \times \cos \theta.$$

As the base of a triangle thus calculated is obviously shorter than the hypotenuse, the ground area is proportionately less than the area of an inclined roof.

Consequently the weight (W_1) per square foot on the ground area is greater than the weight (W) per square foot on the roof surface, and the weights per square foot are inversely proportional to the areas, as shown by the equation

$$W_1 = W \div \cos \theta \quad . \quad . \quad . \quad . \quad . \quad (1)$$

Example (1): Find the weights per square foot of ground area corresponding to the weight of 10 lb. per square foot of roof surface for roofs with the slopes of (1) 5° 43′, (2) 22° 0′, (3) 33° 40′, and (4) 45°.

(1) $W_1 = 10 \div \cos\ 5° 43' = 10 \div 0{\cdot}9950 = 10{\cdot}025$ lb.
(2) $W_1 = 10 \div \cos\ 20° \quad = 10 \div 0{\cdot}9272 = 10{\cdot}78$ lb.
(3) $W_1 = 10 \div \cos\ 33° 40' = 10 \div 0{\cdot}8323 = 12{\cdot}10$ lb.
(4) $W_1 = 10 \div \cos\ 45° \quad = 10 \div 0{\cdot}7071 = 14{\cdot}14$ lb.

(*b*) *Occasional Loads* include the weight of snow, the pressure of wind, and the weight of workmen and appliances employed in roof maintenance and repair.

As a general rule the last of these need not be taken into account, as the usual allowance for snow provides a sufficient margin of safety, especially in view of the fact that repairs are never executed when a roof is covered with snow. The customary allowance for wind pressure is also large, but there is a possibility that high winds might arise after the fixing of stagings and other appliances for the purposes of repair. Therefore it may sometimes be wise not to regard the calculated wind load as including occasional loads due to repairing operations.

The importance of taking into account the weight of temporary staging and platforms suspended from roof members is emphasised by the Report of Major Pringle to the Board of Trade on the Charing Cross accident in December, 1905.

The following extracts from the Report contain particulars relative to the staging employed on the roof for the purposes of repair at the time of the failure:—

"In accordance with former practice, timber stages were slung under the entire surface of the south end bay of the roof. Each stage, in two portions, measured 35 ft. in length by from 12½ ft. to 20 ft. in width. They were suspended by hanging irons from the roof purlins, and formed a series of platforms, at different levels, extending from wall to wall. Sailcloths were provided under the staging, which was close-boarded, as a protection for the workmen.

At the time of the collapse half the length of the staging extended on either side of the principal nearest to the wind screen, which was thus loaded with extra weight due to staging, men, necessary materials, etc. In addition, there appears to have been stacked outside on the crown of the roof zinc sheets and glass, which are estimated to have weighed about a ton.

After making all allowances for glass, etc., which had been removed, the total extra weight brought on the roof appears to have been about 32 tons, and it is calculated that of this total the proportion carried directly by the first principal, which was the one to fail, was about 17½ tons. This represents about 5 lb. per square foot of roof area supported by this principal. The additional weight of the temporary staging was the immediate cause of failure, but as the total stress in tension, at the time of failure on the whole sectional area of the bar did not exceed 5·13 tons per square inch. I find that, for the necessary purposes of repair, such a stress was not in any way unreasonable, and could not be anticipated to cause danger of failure."

Of course, it is admitted that if it had not been for the hidden flaw in the broken tie-bar at Charing Cross the roof would easily have carried all the staging employed, as well as a heavy wind load. We do not suggest that it is always necessary to make special allowance for such apparatus in the design of ordinary roof structures, but the opinion quoted is sufficient to indicate that the class of occasional load to which reference is here made ought not to be entirely overlooked.

Snow Loads.—The weight of snow likely to accumulate upon a roof depends so much on the locality that no general rule can be laid down.

In the United Kingdom a thickness of 6 in. in rarely exceeded, and as the weight of freshly-fallen snow is about 6 lb. per cubic foot, the corresponding load for a layer 6 in. thick would be 3 lb. per square foot on a flat roof. In exceptional circumstances it is possible that successive falls might deposit snow to a depth equivalent to 12 in. of freshly-fallen snow, but even then the total weight per square foot of horizontal surface would not exceed 6 lb., which is the maximum allowance made in this country.

By the rules of trigonometry, the area of a roof surface bears to the ground area covered by the same roof the proportion represented by the equation

$$hyp = \text{base} \div \cos \theta,$$

and as the weights (W) per square foot of roof surface and (W_1) per square foot of ground area are inversely proportional to the areas in question, we have

$$W = W_1 \times \cos \theta \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

Example (2): Find the weight of snow per square foot of roof surface corresponding to the weight of 6 lb. per square foot of ground area covered by roofs with the slopes of (1) 5° 43′, (2) 22° 0′, (3) 33° 40′, and (4) 45°.

(1) $W = 6 \times \cos\ 5° 43' = 6 \times 0{\cdot}9950 = 5{\cdot}9700$ lb.
(2) $W = 6 \times \cos\ 22° 0' = 6 \times 0{\cdot}9272 = 5{\cdot}5632$ lb.
(3) $W = 6 \times \cos\ 33° 40' = 6 \times 0{\cdot}8323 = 4{\cdot}9938$ lb.
(4) $W = 6 \times \cos\ 45° \quad = 6 \times 0{\cdot}7071 = 4{\cdot}2426$ lb.

In North America the snow load varies considerably with the latitude, being taken at about 30 lb. per horizontal square foot in Canada, Northern New England, and Minnesota; 20 lb. in the latitude of New York and Chicago; 10 lb. in the latitude of Baltimore and Cincinnati; and at reduced values for Southern latitudes.

For roofs having a pitch of 60 deg. and upwards the snow load may be neglected, as at such slopes the snow would not be able to accumulate.

Wind Pressure.—The pressure of wind on the roof of a building depends upon the direction and velocity of the wind, and upon the inclination of the roof.

Wind is usually assumed to move horizontally. When wind impinges upon the inclined surface of a roof it exerts a small force along the surface, but this is so small as to be negligible so far as roof loads are concerned, although it is of importance in connexion with the penetration of rain, snow, and draughts through the joints of the roof covering.

The resultant pressure of horizontal air movement against an inclined roof surface may be represented, for all practical purposes, by a normal force varying with the slope of the roof.

Reliable data are not available for guidance as to the maximum wind pressure attained in this country, but the pressure of 40 lb. per square foot is rarely exceeded on a surface of considerable area.

TABLE XIX.—APPROXIMATE WEIGHT OF ROOF COVERINGS PER SQUARE FOOT OF ROOF SURFACE.

Material.	Notes.		Weight lb. per sq. ft.
Asbestos-cement tiles	⅛ in. thick	—	2·3 –3·75
Asphalted felt	—	Exclusive of boarding	0·3 –0·5
do.	With tar and sand	do.	0·8 –1·0
Battens	—	—	1·0 –2·0
Boarding	¾ in.	—	2·5
	1 in.	—	3·5
	1¼ in.	—	4·25
Copper	16 oz. without boarding or rolls	Allowing for laps and seams	1·2
Glass	Without sash bars	Sheet	1·5 –3
		Plate	2·5 –6
Iron corrugated	16 S.W.G.	Black	3·0
do.	do.	Galvanised	3·5
Iron sheet	do.	Black	2·5
do.	do.	Galvanised	3·0
Lead	7 lb. without boarding or rolls	Allowing for laps and seams	8·5
Shingles	Pine	—	2·0
Slates	Without boarding or battens	3-in. lap up to 24 × 12	8·5
		3-in. lap 24 × 12	9·0
		3 in. lap over 24 × 12	12·0
Terra-cotta tiles	Without battens or T-bars	—	12–15
Thatch	Including battens, and without absorbed moisture.	—	7·0
Tiles, pan	Without laths, with mortar, and absorbed moisture.	—	11·0
Tiles, plain	do.	—	18·0
do.	(Patent) do.	—	9·0
Uralite tiles	¼ in. thick	—	2·2–2·5
Willesden paper	—	—	0·15–0·18
Zinc	16 V.M.G. without boarding or rolls	Allowing for laps and seams	2·0

The pressure of 41 lb. per square foot has been recorded at Greenwich, and the pressure on the old Tay Bridge, when that structure was blown over, is estimated to have been fully 42 lb. per square foot.

The Board of Trade requirement is that an allowance for wind load of 56 lb. per square foot shall be made for railway bridges in exposed positions.

In the United States the usual allowance for wind load on a vertical surface is from 30 lb. to 50 lb. per square foot.

The normal pressure per square foot on the inclined surface of a roof can be calculated approximately by either of the following empirical formulæ:—

Hutton's formula:

$$p_n = p.sin\ \theta^{1\cdot84\ cos\ \theta - 1} \quad . \quad . \quad . \quad . \quad (3)$$

Duchemin's formula:

$$p_n = p\,\frac{2\ sin\ \theta}{1 + sin^2\ \theta} \quad . \quad . \quad . \quad . \quad . \quad (4)$$

where p_n = intensity of normal pressure on roof.

p = intensity of horizontal wind pressure.

θ = angle of roof surface with the horizontal.

Of these two rules that of Duchemin is the more convenient for general use, and is also preferable for the reason that it gives slightly higher results, and therefore conduces to safer design.

Example (3): Find the intensity of normal wind pressure on a roof with the slope of 30 deg., the intensity of horizontal wind pressure being taken at 40 lb. per square foot.

Using Duchemin's formula, we have

$$p_n = 40\frac{2\ sin\ 30^\circ}{1 + sin^2\ 30}$$

$$= 40\frac{2 \times 0{\cdot}5}{1 + 0{\cdot}25} = 32\ \text{lb.}$$

Table XX. has been calculated in the same way for the roof slopes commonly used in architectural practice.

TABLE XX.—NORMAL WIND PRESSURE ON ROOF SURFACES ON VARIOUS SLOPES.
(Calculated by Duchemin's Formula.)

Angle with Horizontal.	Ratio of Rise to Span.	Horizontal Wind Pressure.	
		40 lb. per square foot.	50 lb. per square foot.
5° 0′	—	6·9	8·6
5° 43′	1/10	7·8	9·8
7° 36′	1/7½	10·4	13·0
10° 0′	—	13·5	16·8
11° 18′	1/5	15·1	18·8
15° 0′	—	19·4	24·3
18° 26′	1/3	23·0	28·7
20° 0′	—	24·5	30·6
22° 0′	1/2½	26·0	32·5
25° 0′	—	28·7	35·8
26° 33′	1/2	29·4	36·8
30° 0′	—	32·0	40·0
33° 40′	2/3	33·4	41·8
35° 0′	—	34·5	43·1
40° 0′	—	36·4	45·4
45° 0′	1	37·7	47·1

For the purpose of comparison we give in Table XXI. the normal pressures for some roof slopes, in accordance with Hutton's formula.

TABLE XXI.—NORMAL WIND PRESSURE ON ROOF SURFACES OF VARIOUS SLOPES.
(Calculated by Hutton's Formula.)

Angle with Horizontal.	Horizontal Wind Pressure.	
	40 lb. per square foot.	50 lb. per square foot.
5°	5·1	6·4
10°	9·1	12·1
15°	14·2	18·0
20°	18·4	22·6
25°	22·6	28·8
30°	26·5	33·0
35°	30·1	37·8
40°	33·3	41·6
45°	36·0	43·0

PROPOSED NEW BUSINESS PREMISES, LIVERPOOL.—It is intended to erect new premises at the corner of Edmund-street and Bixteth-street, Liverpool, with a main entrance immediately opposite the new Cotton Exchange, to provide accommodation for merchants, brokers, and others engaged in the cotton trade. The designs for the proposed building have been prepared by Messrs. Matear & Simon, architects.

Builders' and Contractors' Column.

A NOTE ON ESTIMATING FOR EXCAVATION AND CONCRETE WORK.

THERE are one or two points which might be given more attention by builders in estimating for foundation work. Firstly as regards excavation: Sufficient allowance is not generally made for the expansion of the excavated material. The usual practice seems to be to assume that 1 yd. in the solid will make the load of 1¼ yds. in the loose. In actual work this allowance is sufficient for dry earth, but is quite inadequate in the case of clay soils, the expansion of which varies from 50 to 100 per cent. Secondly as regards concrete: A customary method appears to be to assume that six parts of ballast and one part of cement will make six parts of concrete. This, however, is not the case, the skrinkage of the ballast after adding the cement and water being as much as 20 per cent. in some cases, and varying, of course, with the nature of the aggregate. A ton of cement is often assumed to be equivalent to a yard cube, whereas it will be found actually to measure one-twelfth of a yard only. The difference in cost these allowances make is best shown by an example. Let us assume the 6 to 1 Portland cement concrete is to be made, the price of ballast being 6s. per yard cube delivered and the cement 30s. a ton delivered, including cost of sacks and unloading.

Then by the usual method the cost will be as follows:—

	s.	d.
6 yds. cub. ballast at 6s. =	36	0
1 yd. cub. cement at 30s. =	30	0
6)66	0	
	11	0
Labour and water.....	1	6
	12	6
Profit, 10 per cent.	1	3
Cost per yd. cub. of concrete	13	9

Whereas the correct method gives the cost as follows:—

	s.	d.
6 yds. cub. ballast at 6s. =	36	0
1¾ tons cement at 30s. =	32	11
6)68	11	
	11	6
Labour and water.....	1	6
	13	0
Shrinkage, say 15 per cent.	1	11
	14	11
Profit, 10 per cent.	1	6
Cost per yd. cub. of concrete	16	5

Showing an increase in price over the first method of practically 20 per cent. The fact that some builders make these allowances whilst others disregard them probably accounts to a considerable extent for the wide difference in estimates for ground work, and it would be interesting to hear the results of observations taken by other persons. The shrinkage in the case of coke breeze concrete floors is inappreciable, 6 yds. of breeze and 1 yd. of cement making 6 yds. of breeze concrete.

Obituary.

L. FRANÇOIS BOITTE.—We have to record the death at Fontainebleau, at the age of seventy-six, of M. Louis François Boitte, architect, and a former winner of the Grand Prix de Rome. He was a pupil of Blouet and of Questel, and on his return from his studentship residence in Rome he was appointed by Paul Dubois to design the architectural portion of the monument to General Lamoricière now in the cathedral of Nantes. In 1877 he was appointed architect to the palace of Fontainebleau, where he made some important restorations, and also published a learned monograph on the building. During four years he undertook, at the Ecole des Beaux-Arts, the course of lectures on the history of architecture. M. Boitte had unhappily lost his sight for some time previous to his death.

POLICE-COURT ROOM, PORTOBELLO.—The transformation of the interior of Portobello Municipal buildings is so far advanced that the new police-court room has been opened. Mr. Morham, the City Architect, prepared the plans.

General Building News.

NEW CHURCH, WARRINGTON.—The foundation-stone of the chancel of a new church, which is being built at Warrington, Staffordshire, was laid on the 6th inst. The church will consist of nave, seating 216, with north porch, chancel, accommodating a choir of twenty, with the clergy, and with space for communicants and the communion table, the length being 22 ft., and the width 17 ft. There will be a recess on the south side of the chancel like a small organ-chamber, with arched openings to the chancel and to the nave. A transept on the south side of the nave provides a vestry with a screen to divide it from the nave. Under the vestry is a heating vault, it being intended to heat the church with a hot-water apparatus. The whole will be built of stone, the interior being plastered, and having stone dressings to the chancel arch, and the windows of the chancel. The roofs will be well timbered, open up to the ridge, and covered with Staffordshire tiles. The seating of the nave will be chairs, with benches for the choir in the chancel. The builder is Mr. Thomas Godwin, of Hanley, his contract being 1,630*l.*, and the architects are Messrs R. Scrivener & Sons.

NEW CHURCH, KINNEGAD, CO. WESTMEATH.—The foundation-stone has just been laid of a new Roman Catholic church at Kinnegad, of which Mr. T. S. MacNamara, Dublin, is the architect, and Mr. J. Wynne, of Dundalk, the builder. The style of architecture is Gothic, and the church comprises nave, transepts, and sanctuary, with side chapels. It will be built of local stone, with window and door dressings of limestone from the Tullamore quarries. The main entrance to nave has a chiselled limestone porch, and two traceried two-light windows light the gallery. There is a broad octagonal chancel with chapels on either side, and divided by arcading with richly-worked arches and columns of granite from the Galway quarries. The plinths and bases of the columns are of granite from the Newry quarries. The nave has an open timber roof, the wrought and moulded principals of which rest on carved corbels. The transepts have open timbered roofs, with three-light traceried windows in the gables and ornamental quatrefoil lights in the side-walls. The tower and spire will rise to a height of 170 ft. The dimensions of the church are: length, 128 ft.; nave, 34 ft. wide; with double transepts 32 ft. wide.

CHURCH RESTORATION, KNOCKANDO, N.B.—During the past year extensive alterations have been carried out on the Parish Church of Knockando. The contractors for the work were—Mason, Mr. Robert Sutor, Aberlour; carpenter, Mr. George Bruce, Petty; plasterers, Messrs. Hume Brothers, Dufftown; painters, Messrs. Dixon & Bain, Grantown; plumbers, Messrs. Fyfe & Co., Aberlour; heating, Messrs. Macknezie & Moncur, Edinburgh. The architect was Mr. John Robertson, of Inverness. The total cost of the repairs will amount to about 2,000*l.*

CHURCH RESTORATION, HENSTEAD.—The restoration of Henstead Parish Church has now been completed. The plans were prepared by Mr. W. D. Caröe, architect to the Ecclesiastical Commissioners, and these have been carried out by Mr. J. S. Smith, of Norwich. The south door has been relieved of a thick colour wash, while the small north Norman door, which was previously lost to view in brickwork, has been opened out. Formerly there was little indication of the separation of the chancel from the nave, but a projection on the outside of the north wall led to the finding of the Rood Stair with upper and lower doorways. These doors have now been replaced, and a wood beam of Norfolk oak, weighing three-quarters of a ton, has been placed in position. The whole of the seating and woodwork in the new church is new, and from one piece of oak panelling that has been found the architect has designed the oak seating, panelling, the pulpit and the prayer-desk.

ROMAN CATHOLIC SCHOOL, BRADFORD.—A new Roman Catholic school in connexion with St. Peter's Church, Bradford, was opened on the 10th inst. The building consists of three stories, the basement forming a large assembly-room, and the two upper floors being divided into class-rooms. Accommodation is provided for about 600 scholars. The school has been erected from plans prepared by Mr. E. Simpson.

PRIMITIVE METHODIST SCHOOL-CHURCH, DARLINGTON.—A new school-church is being erected by the Primitive Methodist body at Harrogate Hill. The building will provide school accommodation, as well as being a place of worship. It will be of red brick with light buff terra-cotta facings, and is being built by Messrs. J. and J. Airey, contractors, of Darlington, from designs prepared by Messrs. Kitching & Lee, architects, of Darlington. The total cost of the two sites and the building, including furniture, will be about 1,350*l.*

WESLEYAN SCHOOL CHAPEL, QUEEN'S FERRY, FLINTSHIRE.—A new Wesleyan School Chapel has been opened at Queen's Ferry. The architects were Messrs. Green, Knowles, & Russell,

of Liverpool; the builders being Messrs. E. Blane & Son, Connah's Quay. The chapel is designed to seat 400 people.

WORKMEN'S HALL, NEW TREDEGAR.—A new workmen's hall has been built at New Tredegar. The building stands on a site on the Tredegar-road, and the total cost of the work is 5,500*l*. The interior of the building contains two floors, ground and gallery, and has a seating capacity for between 1,600 and 1,700. The main floor is 100 ft. by 50 ft., and the depth of the stage is 22 ft., and it is fitted up with wall and foot lights. To the rear of this lie the dressing-rooms, etc., and two main lobbies, which also connect with the scene dock. There is also space partitioned off for an orchestra. The gallery has a front of iron network, access being gained by stone stairways, with an addition in steel for emergency. Externally, the hall is built with native stone, relieved in front with Forest of Dean dressings, and the sides are cemented in rough-cast, with fine dressings. The approach consists of one main lobby, with ticket-offices and two stair lobbies. The architects are Messrs. James & Morgan, Cardiff; the builder Mr. Henry Rowlands, New Tredegar and Treherbert (whose foreman is Mr. Charles Watkins); and the general superintendent Mr. D. W. Price.

PROPOSED COUNCIL CHAMBERS, LEADGATE.—On the 5th inst Mr. W. A. Ducat, Local Government Board Inspector, held an inquiry in the Council Chambers, Leadgate, respecting the application of the Urban Council to borrow 600*l*. for the provision of public offices and Council chambers in St. Ives-road, Leadgate. The clerk (Mr. J. H. Coupland) explained that it was intended to have a Council chamber at the back, with two offices for the clerk and surveyor in the front. Mr. W. Robson (Surveyor) also gave evidence.

MISSION-ROOM, WORTHING.—The new mission-room, which has been erected in connexion with St. Paul's Church, Worthing, on a site in Gordon-road, was opened recently. The hall has been built by Mr. R. James from the plans of Mr. F. C. Cook, and will accommodate about 250 people. It is of brick, with stone facings and slate roof.

PUBLIC BATHS, SOUTH SHIELDS.—On the 5th inst the commemoration-stone of the new baths and wash-houses, which are being erected in Derby-street for the South Shields Corporation, was laid. The cost of the buildings will be about 15,000*l*., exclusive of the cost of the land; and the plans, which have been prepared by Mr. J. H. Morton, architect, of South Shields, make provision for a hall with swimming pond, the water area of which will be about 100 ft. by 30 ft. wide. The seats for spectators will be arranged in the form of an amphitheatre. In the winter the large bath can be floored over, and the hall adapted to the needs of a concert-room, or for public meetings. There are to be sixteen slipper-baths and twelve douche-baths for men on the first floor, and four baths for women on the ground floor. Forty washing compartments will be provided in the public wash-house, and there are also store-rooms, boiler-house, engineer's workshop, engine-room, and storage tank to hold 6,000 gallons of hot, and 6,000 gallons of cold, water. The buildings will be electrically lighted throughout.

THE VICTORIA BATHS, MANCHESTER.—These baths were opened by the Mayor of Manchester on the 7th inst. The site covered by the new building, which is of red Ruabon brick and terra-cotta, built in the Renaissance style, has an area of 7,395 sq. yds. There are three swimming-baths in the building, a first-class bath and a second-class bath for men, and a separate bath for women. The first named is 75 ft. long and 40 ft. wide, and the depth varies from 3 ft. to 6 ft. The bath is of concrete with a lining of asphalt, and the inside surface and the sides and ends are faced with glazed bricks. The bottom is laid with tiles. This bath will hold 78,612 gallons of water. There are dressing-boxes around the sides, and above these a gallery for the use of spectators. Showers from the roof are provided to cool the atmosphere, and a diving-board is provided with a water-chute. The top of the chute is 12 ft. 6 in. from the water level. The second-class men's swimming-bath is 75 ft. by 35 ft., and the women's swimming-bath is 75 ft. by 30 ft. Foot and shower baths are provided for workpeople. The other bathing provisions are Turkish and Russian baths, and sixty-two first and second class private wash baths. The wash baths are of porcelain and all the fittings are of gun metal. The Turkish and Russian baths are on the ground floor. One of the cooling-rooms in the basement has been decorated in Oriental style. A coffee-room, a bicycle storage room, and a complete system of electric bells and telephones are provided. The water supply is obtained from a bore-hole 760 ft. deep, 18 in. in diameter at the top, and 4½ in. at the bottom. It is lined with perforated pipes, and the water is pumped by air pressure. A feature of the machinery equipment is a plant for continuous purification of the water used in the swimming-baths. The premises have been built by Messrs. C. H. Normanton & Sons, to the designs of the City Architect, Mr. Henry Price. The engineering work has been designed and carried out under the direction of Mr. L. H. Lewis, the hydraulics engineer of the Waterworks Committee, and the machinery and equipment of the laundry under the supervision of Mr. J. Derbyshire, the manager of the Manchester Corporation baths. The total cost has been 54,144*l*.

COUNCIL OFFICES, CAMBERLEY.—The opening of the new offices of the Frimley Urban District Council took place a short time ago. The offices have been erected on the Blairmore site in the London-road, Camberley, and are of local bricks, with tiled roof, the walls over the main entrance being enriched with columns and pediment in Monk's Park stone. From the entrance is a flight of stairs to the first floor, where a corridor communicates with offices for the clerk, the surveyor, the medical officer, and sanitary inspector. There is also a strong room and a cloak room and lavatory. On the upper floor is the council chamber, 37 ft. long and 25 ft. wide. All the walls are distempered white and the woodwork is painted a dark brown. The building is heated by hot water from the basement, which is reached by a sloping way from the main entrance. The offices have been built by Mr. W. Watson, of Ascot and Camberley, in accordance with designs by Messrs. H. R. and B. A. Poulter, architects, Camberley, and the total cost is 2,339*l*.

MEMORIAL HALL, BOTHWELL, N.B.—On the 8th inst. the Russell Memorial Hall, in the village of Bothwell, was opened. The hall, which occupies the site of the old parish school, has been designed by Mr. Alexander Cullen, architect, Hamilton, and is of Gothic design. It accommodates about 400, while at the back there is a hall for ladies' work, with necessary adjuncts. The cost has been about 2,500*l*.

INDUSTRIAL SOCIETY'S PREMISES, HUDDERSFIELD.—The Huddersfield Industrial Society's new premises in Buxton-road were opened recently. A considerable portion of the premises hitherto known as the Victoria Hall have been pulled down, but the hall itself has practically remained untouched. The new part has a frontage of 92 ft. to Buxton-road; the height from the footpath to the top of the parapet is 54 ft., exclusive of the roof; and the depth from front to back is 52 ft. The building consists of a basement, ground floor, first and second floors, and an attic. In the basement is a restaurant, a commercial room, a smoke room, and lavatory accommodation for ladies and gentlemen, together with a kitchen and scullery, fitted up with the cooking apparatus, by Messrs. T. A. Heaps & Co., Huddersfield. On the ground floor there are furniture departments, etc., on the first floor showrooms, and the second floor is reserved for stockrooms. The attic is used for a workshop. The building is electrically lighted and heated by steam. The cost of the additions is about 10,000*l*. The whole of the works have been carried out from designs prepared by and under the supervision of Mr. Joseph Berry, architect, Huddersfield.

Stained Glass & Decoration.

ST. ANDREW'S CHURCH, NOTTINGHAM.—On Thursday a window and tablet were unveiled and dedicated in memory of the late Mr. H. S. Irons, for many years organist of the Church. The memorial is a single figure window in the style of the Mediæval period, the subject chosen being the figure of Saint John the Evangelist. The window has been executed by Mr. Alex Gascoyne (Messrs. Gascoyne & Son), of Nottingham, and the bronze tablet by Messrs. Elgood & Brown, of Chester, under the direction of Mr. A. Ernest Heazell, architect, of Nottingham.

Sanitary and Engineering News.

BAKER-STREET AND WATERLOO RAILWAY.—Mr. T. J. Hare presided over the recent sixteenth half-yearly general meeting. The Underground Electric Railways Company of London, contractors, have completed the line, and the carriage depôt and workshops at St. George's-circus, Southwark. The line is now opened to Kennington-road (Westminster Bridge-road Station), and it is anticipated that the extension to Paddington Station will be completed, as far as Edgware-road, before next winter. The Elephant and Castle Station was opened for traffic on August 5. The uniform fare of 2d. for any distance is now relinquished, and arrangements are being made with other companies for the issue of through tickets. For the period of sixteen weeks during which the line had been open, the gross receipts amounted to 23,490*l*., and the total working expenses to 16,680*l*., exclusive of maintenance of way, works, and stations, repairs, and renewals of rolling stock, etc., those items being payable by the Underground Electric Railways Company. The spaces throughout the line have now been let for advertisements.

WATER SUPPLY IN MIDDLESEX.—Dr. Young, the Medical Officer of Health for the County of Middlesex, in his annual Report issued on Monday, says that the whole area of the county, except some of the outlying parts of rural districts, is now provided with water from one or other public water supply, and from returns made by local medical officers of health it appears that, in the case of each of twenty-six districts, the number of houses obtaining water from the public mains is over 90 per cent. of the whole, and in most of these the percentage is given as 99 or 100. As regards the remaining districts, it is reported that in Feltham 75 per cent., in Hayes 80 per cent., in Ruislip-Northwood 80 per cent., and in Uxbridge (rural) 70 per cent. of the houses have a public water supply, whilst in the case of six districts information is not given. New wells were sunk in three districts, viz., four in Staines (urban), two in Sunbury, and nineteen in Staines (rural). These were probably deep wells in connexion with waterworks. Wells were cleaned and repaired in twenty-nine instances. In fourteen districts a total of forty-seven wells are reported as having been closed owing to the water being found to be polluted. In the majority of the districts from 80 to 100 per cent. of the houses are supplied on the constant system, and from the record of houses supplied during the year with draw-taps direct from the mains it appears that the number of houses so circumstanced is gradually increasing.

DRAINAGE SCHEME, AYR.—The drainage scheme for the burgh of Ayr, which has been proceeding continuously for the past ten years, has been practically finished at a cost of 90,000*l*. The entire work, including the concentration of the sewage, formerly discharged through nine outfalls on the beach, and its conveyance out to sea through two outfalls, was designed and has been carried out by Mr. John Eglesham, C.E., Ayr, who was burgh surveyor when the scheme was inaugurated. There have been laid down in all 32 miles of main and outfall sewers, varying in size from 9 in. to 48 in. diameter, much of it being built of brick 48 in. daimeter. The outfall sewer for the south side of the river is of 42 in. diameter cast-iron pipe, and it is carried on iron saddles resting on iron screw piles, out to sea, 468 yards beyond the esplanade wall, which rises from the beach and 323 yards out from low-water mark of spring tides, the depth of water at the outfall being 21 ft. The main outfall for the division of the burgh on the north side of the river is 24 in. diameter. Of the total cost of the scheme, 42,000*l*. was for the concentration sewers and outfalls, being 35,500*l*. for the south side and 6,500*l*. for the north side.

TRANSPORTER BRIDGE, NEWPORT.—On the 12th inst. Lord Tredegar opened the transporter bridge at Newport. M. Arnodin, with Mr. R. H. Haynes, the Newport Borough Engineer, are the joint engineers of the structure.

Foreign.

FRANCE.—The Académie des Beaux-Arts has decided to defer till next year the award of the prize founded by Duc, the eminent architect, which was to have been awarded this year.——M. Bourgon, architect to the Department of Meurthe-et-Moselle, has been commissioned to build a new prison at Nancy, at an estimated cost of a million and half francs.——The Department of Fine Arts intend to restore the grand staircase of the castle of Loches, once a residence of Louis XI., and which is classed as a Monument Historique.——The municipality of Nancy have opened a competition for the contruction of a tuberculosis hospital in the ancient convent of the Dames de Sacré Cœur at Nancy.——A competition has been opened for the reconstruction of the bridge of La Roche Bernard over the Vilaine. It is to be a steel bridge of one bay 193 mètres in length.——A bridge is to be built over the Loire at Clermont.——A competition is to be opened for the best scheme for bringing water from the lake of Bourget to Aix.——The municipality of Nice will open a competition for the construction of a new lycée for boys.——A bridge is to be built over the Iser between the Communes of Les Fauries and Eymeuse.——The Municipal Council of Paris intend to form, in the garden at the Château of Bagatelle, a botanic garden, together with a museum and a permanent exhibition of plants. There will also be a laboratory and an experiment field, which it is expected will be of use both to horticulturists and artists.——M. Charmoy, the sculptor, has just completed a bust of Zola, to be erected by a subscription

committee at Médan on the 30th inst.——The Department of Fine-Arts has classed among Monuments Historiques the church of Lorges (Loir-et-Cher), formerly attached to the Château de Montgoméry. The church contains some important sculptures of the XVIth century. The buildings of the bishop's palace have also been classed under Monuments Historiques.——A new lunatic asylum for the Department of Saone-et-Loire is to be built at Macon, at a cost of about 2,000,000 francs.——A scholastic establishment, under the name of Collège Jules Ferry, is to be built at Saint Dié.——M. Leheurteur, architect, has been commissioned to carry out at Neufchâteau (Vosges) a building to contain a theatre and a concert-room, at an estimated cost of 100,000 francs.——The Conseil-Général of La Vendée has under consideration a scheme for constructing a dyke about 4,000 mètres long in order to connect the island of Normontier with the mainland. The cost is estimated at 1,600,000 francs.——A vote of 1,700,000 francs has been made for the cost of raising the water-level in the basins of the Port of Ste. Nazaire. A sum of 700,000 francs has also been voted for the provision of an additional supply of water to the town.——It is proposed to demolish the Pont Neuf at Cahors, which dates from the XIVth century, and replace it by a steel bridge. Strong protests have been made against the proposal, on historical and archæological grounds.——A bridge over the Aude at Carcassonne, between the Rue Antoine Marly and the abattoir, is to be rebuilt in concrete-steel. The cost is estimated at 110,000 francs.——The death is announced, at the age of fifty-four, of M. Alexandre Conty, architect, of Tours, a member of the Société Centrale des Architectes.——The death is also announced, at Paris, at the age of seventy, of a talented sculptor, M. Etienne Leroux. He was author of many interesting works, among which may be mentioned the statue of Jeanne d'Arc at Compiègne and the monument to Sadi-Carnot at Chabanais. He had received medals at various Salon exhibitions, and was elected to the Legion of Honour in 1878.

GERMANY.—The Society of Architects and Engineers of Bohemia has recently celebrated its fortieth anniversary. The city of Prague presented the Society on this occasion with the gold medal for merit as a recognition of the signal services the Society has rendered the town on questions of art and sanitation. The burgomaster styled the Society "the advisory body" of the municipality and complimented it on uniting professional ability with tactful ways and economical methods.——The Bismarck Monument in Hamburg is an example of the assistance architecture can render sculpture by providing a suitable setting and thus enhancing its effect. The architect, Emil Schandt, and the sculptor, Lederer, together designed this fine work. The statue is 14.8 metres high, and stands on a mighty stepped base, while the ground around is enclosed with flights of steps and a boundary wall. The figure weighs 625.000 kgs. and is built up of 100 blocks of stone in ten courses. Thirty masons and sculptors worked on the figure at four different levels.——As the new Town Hall in Leipzig has not sufficient accommodation for all the administrative departments of the town, a new block of offices will be built on the adjoining site, connected by two bridges with the main building. The plans were prepared by engineer Licht, who also designed the Town Hall and the building will cost 2,850,000 francs.——May 29th was the centennial of the birthday of Karl Bötticher, the investigator of the methods of construction adopted by the Greeks, and the author of the then epoch-making work "The technique of the Greeks."——Whilst pulling down a house at Pfreimd, a small iron chest, 30 by 15 by 14½ centimetres was found, containing seven goblets and a quantity of jewellery bearing the Augsburg mark and dating from the XVIth century. This is supposed to be part of the treasure of the Landgraf von Leuchtenberg and to have been walled up at the beginning of the Thirty Years' war. The collection was purchased for 40,000 marks by Messrs. Aichinger, of Weiden, and presented to the Bavarian National Museum.——The Architectural section of the Art Exhibition in Berlin is of very modest proportions, yet the room set apart for the exhibits is unfortunately large enough for them and too large for the public. None of the designs represent the work of municipal or provincial official bodies, so that we cannot compare this work with that of independent architects. The entries for the engineering section on the contrary, are double the number they reached on the last occasion and show a satisfactory degree of artistic merit.

AUSTRIA.—On August 21st died the painter Eugen Felix, in his seventieth year. He was a versatile and prolific artist, handling with equal facility animal life, portraiture, and genre pictures. His *chef d'œuvre*, "Pan with Bacchantes" is a model of grouping and of the treatment of the nude.

SWITZERLAND.—In April 1905, the new hospital at Interlaken was opened. It consists of three buildings; the main block for seventy beds, the isolation block for twenty-eight beds, and the dependence which includes the mortuary, dissecting room, laundry, etc. Herr Ernst Baumgart, of Bern, designed the hospital, which cost 585,000 francs, site included.

PARTIAL RE-BUILDING OF LEGHORN.—Mr. Carmichael, the British Vice-Consul, in a report recently received at the Foreign Office, states that during the past year considerable portions of the old town of Leghorn have been demolished. Fortunately the old town has but little historic interest or artistic beauty, so that archæologists can have no cause of complaint. The Grand Duchy of Tuscany was without a proper seaport town, and Leghorn was planned in one design at the end of the sixteenth century and built in an incredibly short space of time. None of the buildings demolished is of more ancient date, and many of them had been some time since condemned as uninhabitable. The hospital, a huge building, once the residence of the numerous Leghorn galley slaves, was entirely surrounded by the worst of the slums. The present demolition clears it completely, leaving ample open space on all sides. A part of the space is being laid out in gardens. Much of the space secured by the general demolition will be preserved unbuilt upon, thus giving light and air to the town; the piazzas thus secured will be surrounded by handsome public buildings, such as the new post office. Further demolition on a large scale is in contemplation; in fact, it is scarcely an exaggeration to say that almost the whole of old Leghorn might with advantage disappear. Signor Guido Vaccari, the architect, has published an interesting scheme for the demolition and reconstruction of the southern quarter of old Leghorn. He estimates the cost of expropriation at 104,580*l.*; the cost of rebuilding a large handsome modern quarter, including the new prefecture, chief police office (questura), savings' bank, and arcade of shops at 30,000*l.*; the cost of paving, drains, etc., at 40,000*l.*; and he adds a margin for technical and unforeseen expenses of 17,420*l.* The capital required for the whole scheme is thus 462,000*l.* The rental of the new quarter, estimated at 19 lire per square metre, would yield 45,714*l.*, and after deducting an estimate of 19,400*l.* for taxes, upkeep, management, and insurances, the percentage of profit on the capital would be about 5.7.

SOUTH AFRICA.—A survey party recently arrived at Mbabane, the new capital of Swazieland, and building operations on an extensive scale will follow at no distant date.——At Erwelo, in the Transvaal, building work in connexion with the new English church has been begun by the contractors, Messrs. Dougherty & Russell, on the site given by the Government in Joubert-street.—Mr. T. E. Colcutt, president-elect of the Royal Institute of British Architects, has given his award in the matter of the competitive designs for the Transvaal University College which were invited from South African architects. The successful competitor is Mr. R. Howden; the second premium being awarded to Messrs. G. A. H. Dickson & McCowat, and the third to Messrs. Stucke & Banister. Designs were invited for the entire block of buildings, but it is only intended to proceed at present with the erection of the east wing at an estimated cost of 80,000*l.* In presenting his report Mr. Colcutt stated that twenty-nine designs were submitted by twenty-eight architects, one architect having sent in two designs. He added that many of the designs, besides those selected, "are of considerable merit and I venture to express the feeling that your Council, by adopting the first premiated design, have the opportunity of seeing a building erected which will be worthy of a great city." Mr. Howden has been in practise on the Rand for eight or nine years and has designed several important and private buildings. As far as we can judge by a rough engraving in a Johannesburg paper, Mr. Howden's design, though rather monotonous in effect, will make a dignified building. The front elevation shows five blocks identical in treatment, except that the centre and the two end blocks are considerably wider than the intermediate ones. The design shows a rusticated ground story with an engaged Ionic order above, running through two stories, and a heavy cornice and balustrade. This is carried on without alteration across the whole front, seven bays in the centre and side blocks and four bays in the intermediate blocks, the blocks being separated by deep recesses. The same design is carried unbroken along the flank of the building. There is not much thought or invention shown in this, but at all events there is no eccentricity and nothing in bad taste. In regard to the internal arrangements, the basement is to be given up to mining and metallurgy, with a museum for each branch. In connexion with the mining department there will be a general laboratory, a private laboratory, and a lecture room. In connexion with the metallurgy department will be a laboratory, a metallography room, a sampling and grinding room, a laboratory for wet work, a dark room, and a balance room. The ground floor will include a council chamber, registrar's and secretary's offices, a large room for the use of technical societies, and for the Seymour Memorial Library, a general lecture-room and an examination hall. The first floor will provide for the teaching of physics and mathematics, together with class-rooms for teaching the classics, modern languages, and English literature, and also class rooms for evening technical class work. The second floor is devoted to surveying and chemistry, with two large chemical laboratories.

Miscellaneous.

THE CARNEGIE LIBRARY, DUNDEE.—In view of the recommendation of the Sites Committee for the Carnegie Libraries the members of the Dundee Institute of Architects and other architects in Dundee have addressed a memorial to the Provost and Town Council giving reasons against placing this work in the hands of the Burgh Engineer and City Architect. The memorialists are not aware of any single instance in which a city official has been entrusted with the carrying out of such work, and keeping in view the importance of careful and thoughtful planning in a library building, and recognising that it should be of a monumental character, and give an artistic expression of its purpose, urge that it is desirable to extend the area of thought brought to bear upon its design, so that the best results may be secured, and that the incentive of competition is the best method of securing this end. Without reflecting on the Burgh Engineer's merits as an architect they point out that with so many official and administrative duties, along with the supervision of work of an intricate and practical nature, it is not possible for him to give the necessary amount of reflection and study which such buildings demand, and that if it is placed in his hands he must necessarily delegate the greater part of the work to irresponsible assistants. Furthermore, they point out that if the work of designing and carrying out these libraries is done by the Burgh Engineer the attendant expenses would be actually borne by the ratepayers of the city instead of by the donor. A deputation waited on the Town Council on this subject on Thursday, the 6th. Mr. Alexander Speed moved that consideration of the matter be delayed for a month, contending that this matter was being rushed. Mr. John Robertson moved that the matter be proceeded with, and that the City Architect be instructed to proceed with the preparation of the working plans. Ex-Provost Brownlee seconded. Mr. Carnegie moved that the plans be thrown open for competition. As the result of a long discussion, the Council, by 20 to 5, instructed the City Architect to proceed with the preparation of the plans for the libraries.

NATIONAL GALLERIES.—The statue of Gainsborough, which Mr. Thomas Brock, R.A., sculptured in marble, in terms of the testamentary dispositions of the late Mr. Henry Vaughan, has been deposited, by bequest of the deceased, in the Tate Gallery, Millbank. The 49th annual report of the trustees of the National Portrait Gallery states that the total number (168,769) of visitors during last year shows a satisfactory increase for every day in the week, and is the highest since the new gallery was opened ten years ago. The average attendance on Sundays during the summer months amounted to 432. Whilst they are much hindered by lack of wall-space in their efforts to keep up a historical and chronological system of hanging the exhibits the trustees have not yet been able to make arrangements for the acquisition from the military authorities of the site of St. George's recruiting barracks, and so to meet their urgent requirements for an extension of the Gallery.

LONDON, BRIGHTON, AND SOUTH COAST RAILWAY.—At the last general meeting, held under the presidency of Lord Cottesloe, it was announced that a contract for the equipment, for the electrical working of the South London line between Victoria and London Bridge had been undertaken by the General Electric Company, of Berlin, with a stipulation that the plant—the motor equipments excepted—should be of British manufacture. The London Electric Supply Corporation have contracted to supply energy in a minimum amount of 4,000,000 Board of Trade units for a period of seven years, and will bring duplicate concentric mains from their power station at Deptford to Queen's-road station, Peckham, whence the railway company will take two concentric mains to their main distribution centre at Denmark-hill. The traction will be on the single-phase overhead system, for which a sub-contract is taken by Messrs. R. W. Blackwell & Co., of Westminster, the trucks being made by the Leeds Forge Company. The eight trains are to consist of a trailer between two motor-cars apiece. Messrs. Kincaid, Waller, Manville, & Dawson, consulting electrical engineers to the railway company, will supervise the general work. The enlargement and improvement of Victoria Station have necessitated a complete alteration of the signalling arrangements, for which a fresh system, partly electrical and partly mechanical, is being substituted. The eastern side of the terminus is reserved eventually for the suburban traffic, a large portion of which is now

temporarily transferred to a part of the new station to enable the contractors to continue the work of re-construction.

CONDITION OF HENLEY BRIDGE.—At a meeting of the Henley Corporation on the 6th inst. a special Report was presented to the Corporation by Mr. Griffiths, Engineer to the Thames Conservancy, who said that the cracks in the arches were caused by the settlement of the Oxfordshire abutment, and of No. 1 arch, the latter of which had settled the most. It was apparent, he said, that the structure just above the water level was bulging out upstream, and the parapet was doing the same. A second cause of the settlement of the bridge was the excessive traction-engine traffic over the bridge, which caused great vibration. The crack of No. 3 pier could be traced right to the foundation. It would be expedient to tie the bridge together longitudinally as it was in two parts, and when traction engines passed over the action of the wheels was to thrust out the weakest side of the bridge. The timber foundations of the bridge were well preserved, but, nevertheless, the Corporation must place some substance under the foundations of No. 3 pier so as to form a solid foundation. Until the diver had completed the operations at the foundation of No. 3 pier it would be impossible to tell the extent of the work required on the superstructure, but once it was done the vibration would be greatly diminished. The Corporation finally decided to act on Mr. Griffiths's suggestion as to the solid foundations for No. 3 pier, and to leave the question of tieing the bridge together until this foundation was made safe.

A QUESTION OF CHURCH "RESTORATION."—The Chancellor of the diocese of Hereford has granted a faculty to the rector and churchwardens of Sarnesfield for certain alterations to be done to their parish church for the purpose of undoing some former work of so-called restoration. The circumstances are thus set forth in the Chancellor's judgment:—"In this case the Rev. William Marshall, the rector of the parish of Sarnesfield, and the churchwardens have applied to the Consistory Court to grant a faculty authorising them to make certain alterations and repairs in the parish church. The costs of the repairs and alterations will be defrayed by Mr. Isaac Marshall, of Sarnesfield Court, brother of the rector, who is the principal landowner in the parish, and patron of the living. The church is a small one, containing accommodation for sixty persons, the population of the parish being 115, but it is a very ancient one, and remarkable for its architecture, and I therefore felt it my duty to take the evidence in London of Mr. Roland William Paul, F.S.A., who is acting as architect for the patron. According to Mr. Paul's evidence, it dates from Norman times, and the original church consisted of the present nave and chancel only, to which additions have been made during the XIIIth, XIVth, and XVth centuries. About the year A.D. 1190 a chapel was erected called 'The Sarnesfield Chapel,' and the wall on the south side was taken down for the purpose of adding the present aisle, probably for processional purposes, and to give access to the chapel. In the latter part of the XVth century the west tower was erected with a wooden porch of the same date. The chapel is now used as a vestry. In 1870, under a faculty from this court, certain parts of the chancel and south wall of the chapel were rebuilt, and three unsightly windows were inserted in the north wall of the church, two old windows were taken out of the south wall of the chapel, and one large modern window replaced it. The church is in very bad repair, principally owing to the work done in 1870. The timber of a portion of the roof requires repair, and the original south wall of the church in some parts requires to be underpinned. It is now proposed to take down the modern work of 1870 and to replace it in accordance with the old lines on which the church was originally built. In the south wall of the chapel it is proposed to substitute for the present modern window two windows of the same pattern as the old ones, of which a photograph exists, and in the last wall of the chancel to substitute for the modern one a new window on the same lines as the old one. It is also proposed to make good the old north wall of the church by taking out the three modern windows inserted in it in 1870. There are other minor works to be done, such as substituting an oak pulpit for the present stone one, and inserting a new Holy Table for one of stone. There will be choir seats in the chancel, and accommodation for from eighty to ninety persons in the church. In the opinion of the court the proposed alteration will be in keeping with the original architecture of the church, and, in so far, desirable to be made. I will, therefore, decree the faculty to issue as prayed." In delivering the judgment on behalf of the Chancellor, his Surrogate, the Rev. A. J. Capel, remarked that people were beginning to find out that restoration was a totally different thing to reconstruction. A great deal of work had been done in connexion with churches during the last fifty years which would all have to be done over again, for it would have to be pulled down, and the original state of the fabric replaced.

RANSOMES' ELECTRICALLY-DRIVEN HORIZONTAL LOG BAND SAW.—A new type of saw-mill capable of dealing with logs of any timber up to 4 ft. in diameter, and if necessary up to 100 ft. long, has recently been introduced by Messrs. A. Ransome & Co., of Newark-on-Trent. The most noteworthy feature of the machine, which has been patented by Messrs. Ransome & Lavo, is that the saw is driven by an enclosed electric motor built around the shaft of the driving pulley, an arrangement making the machine entirely self-contained and obviating all driving belts, countershafts, and gear wheels. Thereby a considerable loss of power is eliminated and the width of the machine is reduced to 17 ft. 6 in. as compared with 34 ft. 6 in., the latter being the width of a similar machine operated by belting from a countershaft. The motor, capable of developing 50 electrical horse-power, was specially designed by M. Lavo, who must be congratulated on the achievement of designing an enclosed motor capable of keeping cool while supplying the large demand for power required without being too heavy for attachment to the saw pulley shaft. A supplementary motor of 12 electrical horse-power, transmitting power through a silent driving chain, is provided for the reciprocating movement and the rising and falling motions of the log carriage. Other features of the machine to which attention may be directed are the ball bearings for the saw pulley shafts, and the automatic device for raising and lowering the saw, the speed of this motion being controllable by means of a hand lever. The machine, which is designed on the familiar model of the iron-planing machine, is built up on a massive bedplate providing a steady foundation for the uprights of the main frame and extending beneath the auxiliary frame carrying the control apparatus. The travelling carriage has two longitudinal rolled steel girders of deep section connected transversely by cast-iron arched beams fitting over the top flange of each girder and against the inside face of each web. The track on which the carriage runs consists of steel rails laid on longitudinal sleepers and 8 in. wheels in suitable frames, bolted at short intervals apart. No special foundation is required for the machine when in regular use. At a trial run conducted a week or two ago at the makers' works, the machine merely rested on the floor and although the saw was run at the speed of 7,000 ft. per minute no vibration was perceptible. The saw fitted to this machine is very thin and having comparatively little set, the result is that a larger number of boards can be cut from a log than would be possible if a vertical frame or horizontal single or double blade reciprocating frame were employed. During the trials mentioned above, when 1,077 sq. ft. of elm and oak boards were cut from the log, the electric current used was 11.5 Board of Trade units, which at 1d. per unit gives about 10.68d. as the cost of cutting 1,000 sq. ft. The cost of labour is stated to have been at the rate of 2s. 8d. for the same measurement, making the total cost for power and labour a fraction over 3s. 6d. per 1,000 sq. ft. of boards. The new saw is interesting as an example of progress in mechanical and electrical engineering, as well as for its practical utility to those engaged in the timber industry.

ROMAN FORT, COLBREN.—Colonel Ll. Morgan, R.E., Swansea, is excavating an old Roman camp which occupies an elevated site, about 7 acres in extent, situated on the Sarn Helen Roman road, which extends from Neath to the Gaer, Brecon. Last summer the operations were commenced for a few weeks, and attention was then only devoted to the ramparts and ditches. The foundation of the rampart was discovered to be of a wooden log paving (oak), about 18 ft. wide. The ditches, at a good depth, also revealed the presence of bones and sticking tent pegs. Recently the excavations were re-started, and the space inside the ramparts was examined with the result that a quantity of pieces of pottery and urns, bits of bottles and Roman glass, pieces of bricks, brick floors, stone pitchings, etc., have been discovered. In addition the wooden foundation of the rampart has been proved in another corner so as to suggest that it will be found enclosing the entire camp. The management and the carrying out to the operations are under the direction of Mr. Sydney Lloyd, M.E., Swansea.

NORTHAMPTON INSTITUTE.—In view of the increasing work of the Institute and the inefficiency of the accommodation notwithstanding the large size of the building, the Governing Body have for the coming session taken the rooms of the British Horological Institute in Northampton-square. This extension has made it possible to place the work of the Technical Optics Department in the new buildings and to free the rooms occupied last session by this department for extending work of other departments. In the rooms thus vacated there has been already equipped during the vacation an intermediate electrical engineering laboratory, and another room is to be devoted to an extension of the junior laboratory, another to an extension of the senior electrical testing laboratory, another to an extension of the instrument workshop. The chief extension in the Mechanical Engineering Department consists of an additional room devoted to the Power Laboratory, which has enabled the classes for automobile engineers to be considerably developed.

THE BELFAST NEW CITY HALL.—The first meeting of the Belfast Corporation was held recently in the new City Hall. It is stated that the acoustic properties of the building were not perfect; the members were unable to understand what each other said, while the reporters found the greatest difficulty in getting a position in the room where their work could be efficiently done. It is probable that before the next monthly meeting steps will have been taken to remove the defect.

Capital and Labour.

CONCRETERS' AND ASPHALTERS' ASSOCIATION.—This Association recently met in Manchester, and passed a resolution to the effect that one month's notice should be given to architects, surveyors, and builders, and all others concerned, that in future members of the Association will refuse to prepare any ground for patent flooring, terrazzo, etc., where cheap foreign labour is employed to displace British labour. It is contended that in future such work should be done by members of the Association and under proper conditions. It is alleged that at present many Italians and Germans are brought over to England to lay patent floors under conditions of labour that are altogether unsatisfactory. The meeting also approved of an alteration of rules for admitting to membership those who follow the wood-block flooring trade. It was further agreed to create a section of the Association for the concrete and asphalt labourers, who number 500 in Manchester and the surrounding districts, and another section for bricklayers' labourers and others.

Patents of the Week.

APPLICATIONS PUBLISHED.*

16,502 of 1905.—A. M. JOHNSON and T. RYAN: *Fastening Bolt and Holder for Doors.*

This relates to a fastening bolt and holder for doors, comprising a casing pivotally mounted on the door, a bolt slidably mounted on said casing, and means for holding said bolt against movement in said casing.

16,564 of 1905.—G. M. SCOTT: *Sash Hangers.*

This relates to sash hangers, comprising a bracket containing a clock spring and pinion and a rack adapted to be respectively mounted in a window frame and an adjacent side rail of a window sash, so that the downward movement of the sash will wind up the spring, and means for locking said pinion in any desired position of the sash, in combination with a spring-actuated roller mounted near the corner of said upper sash diagonally opposite to said bracket in the case of an upper sash and horizontally opposite in the case of a lower sash.

23,598 of 1905.—W. H. PRESTWICH: *Canopy for Open Fire Grates or Stoves.*

This relates to a canopy for an open fire grate or stove made of fine wire netting or gauze or perforated plate.

25,317 of 1905.—H. H. HESSE: *Machines for Making Roofing Tiles.*

This relates to a roof tile moulding machine for manufacturing rebated tiles and is characterised in that the base plate of the mould, which imparts the desired profile to the underside of the tile, is rounded to correspond to the rounded part of the side walls of the mould and of the guiding bars for the moulding tools, for the purpose of giving the tile at its rounded part the same stability as its remainder.

25,773 of 1905.—D. SINCLAIR and SINCLAIR IRON CO., LTD: *Radiators for Heating Buildings and the like.*

This relates to radiators for heating buildings and the like, and consists in the arrangement of inwardly turned flanges, preferably two on each side cast on the sides of the combustion chamber, and a metal plate forming the bottom of the circulation chamber and the top of the combustion chamber secured between the flanges on each side, which plate is secured in position by suitable means, such, for instance, as iron cement.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

PATENTS.—*Continued on page 334.*

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, —; Contracts, iv. vi. viii. x.; Public Appointments, xix; Auction Sales, xxx.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

Contracts.

BUILDING.

SEPTEMBER 15.—**Devizes.**—LAUNDRY, ETC.—The Guardians of the Devizes Union invite tenders for the erection of a new laundry and alterations to existing premises at their Union Workhouse, Devizes. Plans and specifications of works can be seen at the office of Mr. O. Sheppard, Clerk to Guardians, Union Offices, Devizes, to whom sealed tenders, endorsed "Tenders for New Laundry," must be sent on or before September 15 by 10 o'clock a.m.

SEPTEMBER 15.—**Nantwich.**—REPAIRS, ETC.—The Trustees of the Beam Heath Estate invite tenders from Nantwich contractors for general repairs and painting to be done at the Willow Farm. Particulars to be obtained from Mr. C. S. T. P. Brooke, Clerk to the Trustees, and tenders must be delivered not later than September 15.

SEPTEMBER 15.—**Penywern, Dowlais.**—HOUSES.—Merthyr Tydfil Corporation invite tenders for the erection of thirty-eight houses at Penywern, Dowlais. Plans of the proposed houses may be inspected at the office of the Borough Surveyor, and copies of the specifications obtained, upon pay of 1*l.* 1s. Tenders, marked "Penywern Houses," must be delivered to Mr. T. Aneuryn Rees, Town Clerk, Town Hall, Merthyr Tydfil, on or before September 15.

SEPTEMBER 17.—**Gwauncaegurwen.**—CHAPEL.—Tenders are invited for the erection of a new C.M. Chapel at Gwauncaegurwen. Plans and specifications may be seen, and bills of quantities obtained, at Anchor House, Cwmgorse, upon the receipt of 2*l.* 2s. Tenders to be delivered to the secretary, Mr. David Jones, Anchor House, Cwmgorse, not later than September 17.

SEPTEMBER 17.—**Morriston.**—COMPLETION OF VILLA.—Tenders are invited for the execution of certain works necessary to complete a villa in Wychtree-street, Morriston. Plans and specifications may be seen at the offices of Mr. Charles T. Ruthen, architect, Swansea, to whom tenders must be sent, endorsed "Tender of Completing Villa," on or before September 17.

SEPTEMBER 17.—**Wigmore and West Bromwich.**—SCHOOL WORKS.—Tenders are required for repairs, painting, and other work at the district schools, Wigmore, West Bromwich. Specification and conditions of contract may be seen, and forms of tender obtained, at the office of Mr. John W. Allen, architect, High-street, West Bromwich, up to September 14. Tenders, under seal, marked "Repairs, Painting, etc.," must be sent to Mr. H. Ward, Clerk, Church-street, West Bromwich, on or before September 17.

SEPTEMBER 18.—**Kilkenny.**—RESIDENCE.—Tenders are invited for the erection of a gentleman's residence at Archers-grove, within one mile of the City of Kilkenny, in accordance with plans and specifications, which can be seen at the offices of Messrs. W. M. Mitchell & Sons, architects, 10, St. Stephen's-green, N., Dublin, or at the residence of the superintending architect, Mr. A. M. Burden, M.Inst.C.E., Bellevue, Kilkenny. Bills of quantities for the work have been prepared by Messrs. Beckett and Medcalf, surveyors, 10, Leinster-street, Dublin, copies of which may be obtained by depositing 1*l.* 1s. Tenders, accompanied by a priced bill of quantities, will be received at either of the above-named addresses up to September 18.

SEPTEMBER 20.—**Foxearth.**—OFFICES.—Tenders are invited for building new offices, etc., at the Foxearth Brewery for Messrs. D. Ward & Son. Plans and specification may be seen at the offices of Mr. A. Ainsworth Hunt, architect, Sudbury and Bury St. Edmunds, with whom tenders must be lodged on or before September 20.

SEPTEMBER 20.—**Greenodd.**—RESIDENCE.—Tenders (whole or separate trades) are invited for the erection of a house at Greenodd. Plans and specifications may be seen, and quantities obtained, at the office of the architects, Messrs. Settle and Brundrit, A.R.I.B.A., Ulverston and Barrow-in-Furness. Sealed tenders, endorsed "House, Greenodd," must be delivered not later than noon, September 20.

SEPTEMBER 20.—**Hull.**—SCHOOL BUILDINGS.—The Education Committee of the Corporation invite tenders for the erection of school buildings in Selby-street West. Drawings and specification may be seen at the office of Mr. Joseph H. Hirst, City Architect, Town Hall, Hull, on and after September 5, and quantities obtained, upon a deposit of 2*l.* 2s. Remittances to be made payable to the City Treasurer. Tenders, sealed, and endorsed "Selby-street West School," are to be addressed to the Secretary of Education, and delivered at the Education Offices, Hull, before 10 o'clock on September 20.

* SEPTEMBER 21.—**Mill Hill.**—NEW SORTING OFFICE.—The Commissioners of H.M. Works and Public Buildings invite tenders for a new sorting office at Mill Hill, N. Drawings, specification, and a copy of the conditions and form of contract may be seen on application to Mr. J. Wager, H.M. Office of Works, Westminster, S.W. Bills of quantities and forms of tenders may be obtained at the undermentioned address, on payment of 1*l.* 1s. Tenders must be delivered before 12 noon, September 21, addressed to the Secretary, H.M. Office of Works, etc., Storey's Gate, S.W., and endorsed "Tender for Mill Hill Sorting Office."

SEPTEMBER 21.—**Nelson.**—BRICKMAKING PLANT.—The Health Committee invite tenders for the following work required in connexion with the erection of brickmaking plant at the Refuse Destructor Works in Charles-street:—(1) Steel work; (2) joiner's work; (3) glazier's work; (4) slater's work. Plans and specifications may be seen, and forms of tender obtained, on application at the office of Mr. B. Ball, A.M.Inst.C.E., Borough Engineer and Surveyor. Tenders, endorsed "Brickmaking Plant, —— Work," to be sent to Mr. J. H. Baldwick, Town Clerk, Town Hall, Nelson, not later than noon on September 21.

* SEPTEMBER 22.—**Chadwell Heath.**—NEW SCHOOL, ETC.—The Essex Education Authority invite tenders for (1) the enlargement of Infants' School, Chadwell Heath and (2) the erection and completion of a new mixed school at Chadwell Heath. Contractors desirous of tendering should send their names to Mr. Jas. Kennedy, architect, 25, Bedford-row, W.C., with deposit of 2*l.* 2s., before September 22.

SEPTEMBER 22.—**Newcastle.**—REGISTER OFFICE.—The Guardians of the Poor of the Newcastle-upon-Tyne Union invite tenders for the erection of a register office for Superintendent Registrar, also for alterations to the Union Offices, Pilgrim-street. Names to be sent to Mr. James Atkinson, Clerk to the Guardians, Union Offices, 127, Pilgrim-street, Newcastle-upon-Tyne, on or before September 22. Quantities will be forwarded in due course by the architect, Mr. A. Stockwell, 11, Pilgrim-street, Newcastle, at whose office the plans may be inspected and any further information obtained.

SEPTEMBER 22.—**Raphoe.**—MANSE.—Tenders are invited for building and completing new manse for the Committee of No. One Presbyterian Church, Raphoe. Plans and specifications to be seen at the office of Mr. John M'Intyre, architect, Letterkenny, or with the Rev. S. Meeke, B.A., by whom tenders will be received up to September 22.

SEPTEMBER 22.—**Water Grove.**—FOUNDATION WALLS, CONCRETE BED, ETC.—Tenders are invited for work required in foundation walls, concrete bed, and concrete under floors, roads, and fences, etc., in connexion with proposed small-pox hospital at Water Grove, near Foolow, Derbyshire, for the Committee of the Haddon Joint Hospital District, Bakewell. Drawings may be seen, and bills of quantities obtained, on application at the office of the architect, Mr. W. R. Bryden, F.R.I.B.A., 3, George-street, Buxton, to whom tenders, sealed, and endorsed "Small-pox Hospital, Water Grove," are to be sent not later than 12 o'clock noon on September 22.

SEPTEMBER 24.—**Pontypridd.**—CAR-SHEDS, ETC.—Pontypridd U.D.C.—Contract No. 1: Tenders are invited from the makers of iron buildings for the supply and erection of car-sheds at Trehafod, near Pontypridd. Contract No. 2: Tenders are invited for the masonry, paving, and other works in connexion with the erection of car-sheds at Trehafod, near Pontypridd. Plans and specifications for each contract may be seen, and quantities obtained, at the office of Mr. P. R. A. Willoughby, Engineer and Surveyor to the Council, upon receipt of a deposit of 1*l.* 1s. Mr. J. Colenso Jones, Clerk to the Council, Municipal Buildings, Pontypridd, to whom sealed tenders, endorsed "Car-sheds, Buildings," or "Car-sheds, Foundations," as the case may be, must be delivered on or before September 24.

SEPTEMBER 25.—**Eyrecourt and Woodford.**—SCHOOLS.—Estimates are required on or before September 25 for erecting new schools in Eyrecourt and Woodford, co. Galway, for the Sisters of Mercy. The plans and specifications can be seen at the Convents of Mercy, Eyrecourt and Woodford, and at the office of Messrs. William H. Byrne & Son, architects, 20, Suffolk-street, Dublin.

SEPTEMBER 25.—**Redruth.**—SECONDARY SCHOOL.—The Cornwall Education Committee invite tenders for erecting a new secondary school at Redruth, according to plans and specifications prepared by Mr. Morley Collins, architect, Clinton-road, Redruth, at whose office the plans may be seen and all information obtained. Sealed, endorsed tenders to be sent to Mr. F. R. Pascoe, Secretary, Education Office, Truro, on or before September 25. The lowest or any tender not necessarily accepted.

SEPTEMBER 25.—**Rottingdean.**—ALTERATIONS.—The Brighton Guardians invite tenders for the conversion of two rooms into one room at the Warren Farm Schools, in the Parish of Rottingdean. Copy of specification and form of tender, together with any further information, can be obtained from Mr. E. Wright, Architect to the Guardians, at the Parochial Offices, where the plans may also be inspected. Sealed tenders, endorsed "Tender for Conversion of Day Rooms," are to be delivered to Mr. B. Burfield, Clerk to the Guardians, Parochial Offices, Prince's-street, Brighton, on or before September 25, by 10 o'clock in the forenoon.

SEPTEMBER 26.—**Armagh.**—ARTISANS' DWELLINGS.—The Armagh U.D.C. invite tenders for the erection of artisans' dwellings on Banbrook-hill, in the City of Armagh, the clearing and laying out of the site, the construction of roads, paths, sewers, manholes, and other works, in accordance with plans and specifications prepared by Mr. F. Bergin, B.E., 36, Westmoreland-street, Dublin. The plans and specifications may be seen at the office of Mr. James Lennon, Town Clerk, U.D.C. Offices, Armagh, on any day, between the hours of 10 a.m. and 2 p.m., where copies of the tender form and schedule of quantities may be obtained by making a deposit of 1*l.* 1s. Tenders, accompanied by a schedule of prices, and containing the names and addresses of two solvent sureties willing to join in a bond for 1,000*l.* for the due performance of the contract, will be received by the Town Clerk up to 6 o'clock on September 26. Tenders should be addressed to the Presiding Chairman, and endorsed "Tender for the Erection of Artisans' Dwellings." No tender will be considered which is not on the proper form.

SEPTEMBER 26.—**Drumcondra.**—ADDITIONS, ETC., TO DISPENSARY HOUSE.—The Board of Guardians of the North Dublin Union invite tenders for alterations and additions to the Dispensary House, Drumcondra, in accordance with the plans and specification, which can be seen and copied at the Board-room, North Brunswick-street, Dublin, on lodgment of a cheque for 1*l.* Contractors are to be bound by the fair wages and local labour resolutions of the Board and against sub-letting any part of the contract, copies of which are attached to the specification. Security, as may be named by the Board, may be required for the due performance of the contract. Sealed tenders will be received in the tender box, Board-room, North Brunswick-street, Dublin, up to 12 o'clock noon on September 26.

SEPTEMBER 26.—**Sherburn Hill.**—BUTCHERING PREMISES.—The Sherburn Hill Co-operative Stores invite tenders for the erection of new premises for the Butchering Department. The plans and specifications can be seen at the office of the architect, Mr. J. Walton Taylor, F.R.I.B.A., St. John's-street, Newcastle-upon-Tyne, to September 15, and after at the offices of the Society, Sherburn Hill, near Durham. Sealed tenders, endorsed "New Butchering Dept.," to be delivered not later than noon on September 26, to Mr. Thomas Robson, Secretary.

* SEPTEMBER 27.—**Ashford.**—LAUNDRY.—The managers of the West London school district invite tenders for erection of laundry at their school at Ashford, Middlesex. Specifications, bills of quantities, and forms of tender may be obtained, and drawings and site inspected, on application at the Clerk's office between 10 a.m. and 4 p.m. Tenders to be delivered to the Clerk to West London District Schools, Ashford, Middlesex, not later than 6 p.m. September 27.

SEPTEMBER 28.—**Dewsbury.**—INFIRMARY EXTENSIONS.—The Dewsbury Guardians invite tenders for the various works required in the erection of extensions to the Infirmary at the Workhouse. Plans and specifications may be seen, and bills of quantities obtained, at the offices of Messrs. Holtom & Fox, architects, Corporation-street, Dewsbury, on and after Saturday, September 15. Sealed tenders, endorsed "Infirmary Extensions," must be left at the Union Offices, Wellington-street, Dewsbury, not later than Thursday, September 27.

* OCTOBER 1.—**Beverley.**—EXTENSIONS.—The East Riding C.C., Beverley, invite tenders for erection of extensions to the East Riding of Yorkshire C.C. Offices, Beverley. Plans and specifications are to be seen at offices of Mr. B. S. Jacobs, architect, Bowl-alley-lane, Hull, and bills of quantities obtained, on payment of 1*l.* 1s., on and after September 21. Tenders to be sent in to Mr. J. J. Bickersteth, Clerk to the East Riding C.C., Beverley, before 10 a.m., October 1.

* OCTOBER 5.—**Wanstead.**—SCHOOL, ETC.—The Wanstead Local Advisory Sub-Committee invite tenders for a two-story school, manual training centre, cookery centre, caretaker's cottage, etc., on the Aldersbrook School site, Ingatestone-road, in the U.D. of Wanstead, Essex. Drawings and specifications may be inspected, and copies of the bills of quantities obtained, at the offices of the architect, Mr. C. H. Bressey, 70 and 71, Bishopsgate-street Within, E.C., upon payment of a deposit of 2*l.* Sealed tenders, endorsed "Aldersbrook School Tender," and addressed to the Chairman, W.L.A.S.C. Council Offices, Wanstead, N.E., must be delivered before 6 p.m., October 5.

No DATE.—**Castlecomer.**—HOUSES AND COTTAGES.—Tenders are invited for the building of some houses and cottages at Castlecomer. Bricks and mortar supplied. Plans can be seen on application to Mr. William Dobbs, Estate Office, Castlecomer.

No DATE.—**Downpatrick.**—PAROCHIAL HOUSE.—Tenders are invited for building additions to, and otherwise improving, the Parochial House, Downpatrick, for the Very Rev. Wm. Dempsey, P.P., V.F. The plans and specification can be obtained at the offices of Mr. J. J. M'Donnell, M.R.I.A.I., 27, Chichester-street, Belfast, to whom sealed and endorsed tenders are to be sent.

No DATE.—**Lambourne.**—BARN.—Tenders are invited for the erection of a new barn on Sheepdrove Farm, Lambourne. Plans and specifications may be seen at the office of Mr. R. L. Barnes, solicitor, Lambourne, between the hours of 10 and 5.

No DATE.—**Newry.**—DWELLING-HOUSES.—Tenders are invited for the erection of four dwelling-houses in Newry for Mr. T. Hanna, U.C. For plans and specification apply to Mr. John Brown, architect, 31, Kilmorey-street, Newry.

ENGINEERING, IRON, AND STEEL.

SEPTEMBER 17.—**Workington.**—WATER PIPES.—The Corporation invite tenders for the supplying and delivering of about 50 tons of cast-iron water pipes, varying in diameter from 12 in. to 3 in., including special castings. Copies of the specification, form of tender, and all other information can be obtained at the office of Mr. W. L. Eaglesfield, Borough and Waterworks Engineer, on deposit of 1*l.* 1s. Sealed tender, endorsed "Tender for Cast-iron Pipes," are

to be delivered at the office of Mr. John Warwick, Town Clerk, Town Hall, Workington, not later than September 17.

SEPTEMBER 22.—**Broomford.**—BRIDGE RECONSTRUCTION.—The Okehampton R.D.C. invite tenders for rebuilding the County Bridge at Broomford, in the Parish of Jacobstowe, according to plans and specifications, which may be seen at the office of Mr. Samuel Hooper, Surveyor, Hatherleigh. Tenders, endorsed "Broomford Bridge," must be sent to Mr. S. Hawken, Clerk to the Council, Okehampton, by 10 a.m. on September 22.

SEPTEMBER 25.—**Manchester.**—STEEL PARAPET.—The Improvement and Buildings Committee invite tenders for the erection of a steel parapet, etc., at Oxford-street Bridge, over the Rochdale Canal. Drawing may be seen, and specification and form of tender obtained, on application at the City Surveyor's Office, Town Hall, Manchester, on payment to the City Treasurer of 1*l.* 1s. All cheques or postal orders are to be made payable to the order of "The Corporation of Manchester." Tenders, enclosed in the official envelope, and addressed to the Chairman of the Improvement, etc., Committee, to be delivered at the City Surveyor's Office not later than 10 a.m. on September 25.

* SEPTEMBER 25.—**Willesden.**—WROUGHT-IRON FENCING.—The Willesden District Council invite tenders for 2830 ft. lineal of wrought-iron unclimbable adjustable fencing, 4 ft. 6 in. in height, and two pairs of 9-ft. gates of similar pattern to fencing, delivered to New Recreation Ground, Harrow-road, Stonebridge, Willesden, N.W. Specification and form of tender can be obtained on application to Mr. O. Claude Robson, Council's Engineer, Public Offices, Dyne-road, Kilburn, N.W. Tenders, on printed forms (with deposit of 10*l.*), and endorsed "Wrought-iron Fencing, Recreation Ground, Stonebridge," to be delivered at the Offices of the Council, not later than 4 p.m., September 25.

* OCTOBER 2.—**Woolwich.**—COVERING HEATERS AND PIPING.—The Metropolitan Asylums Board invite tenders for covering heaters and piping at Brook Fever Hospital, Shooter's Hill, Woolwich, in accordance with specifications and bill of quantities by M. W. T. Hatch, M.Inst.C.E., M.S.Mech.E. Specifications, bill of quantities, etc., may be inspected at the office of the Board, Embankment, E.C., on and after September 18. Tenders, addressed as stated on form, to be delivered at the office of the Board not later than 10 a.m., October 2.

MISCELLANEOUS.

SEPTEMBER 15.—**Horton.**—SCAVENGING.—Tenders for scavenging the Parish of Horton are invited. Specification and form of contract may be seen at the address given below. Tenders (endorsed "Scavenging") to reach Mr. C. P. Summerhayes, Clerk to Parish Council, Horton, Slough, by September 15.

SEPTEMBER 17.—**Portsmouth.**—PULLING DOWN CHIMNEY SHAFT.—The Committee of Visitors of the Borough of Portsmouth Lunatic Asylum invite tenders for pulling down a chimney shaft, about 75 ft. high, in the Asylum Grounds at Milton, in the said borough. Tenders, endorsed "Tender for Pulling Down Chimney Shaft," to be delivered at the Town Hall, Portsmouth, not later than 10 a.m. on September 17.—Mr. Alexander Hellard, Town Clerk.

SEPTEMBER 18.—**Langley.**—SCAVENGING.—Tenders for scavenging the Parish of Langley Marsh are invited. Specification and form of contract may be seen at the address given below. Tenders to reach Mr. T. H. Baldwin, Clerk to the Parish Council, Middle Green, Langley, Bucks, by 10 a.m., September 18.

SEPTEMBER 19.—**Dublin.**—ELECTRIC LIGHTING.—The City of Dublin Technical Education Committee invite tenders for the electric lighting of the Technical Schools, Lower Kevin-street. Specification, with general conditions and form of tender, may be inspected at the office of the City Electrical Engineer, Fleet-street, Dublin, and may be obtained from him on payment of 10s. 6d. for each specification. Tenders (sealed and marked "Tender for Electric Lighting of Technical Schools") must be addressed to the Chairman, City of Dublin Technical Education Committee, Lower Kevin-street, Dublin, and be delivered not later than 12 o'clock noon on September 19. Each tender must contain the names of two sureties, who will be prepared to execute a joint and several bond for the due performance of the contract in a sum of 20 per cent. of the contract price.

SEPTEMBER 19.—**Swinton.**—WELL SINKING.—The Swinton U.D.C. invite tenders for sinking a well. The contract will include providing temporary pumping plant capable of keeping the workings clear of water, and sinking a well, chiefly in dark bind and sandstone, 6 ft. in diameter, about 70 ft. deep. Particulars may be obtained on application. Sealed tenders, endorsed "Tender for Sinking a Well," to be sent to Mr. R. Fowler, C.E., Engineer and Surveyor, Council Offices, Swinton, Yorks, not later than noon on September 19.

SEPTEMBER 19.—**Wigan.**—CLEANSING OF PRIVIES, ETC.—The Wigan R.D.C. invite tenders for the cleansing of privies, ashpits, and cesspools (all farm premises excepted), in Parbold, Shevington, Haigh, Worthington, and Wrightington, divided into the following sections:—Sect. No. 1, the whole of Parbold; sect. No. 2 the west portion of Wrightington, from the road leading from Dangerous Corner, Courage-lane, and Toogood-lane; sect. No. 3, the east portion of the said road, including Mr. Watson's house; sect. No. 4, the portion lying to the south of Wrightington Hall-lane; sect. No. 5, the south-west portion of Shevington, including Back-lane, Miles-lane, Broad-o'-th'-Lane, Church-lane, and Gathurst-lane; sect. No. 6, the north-east portion, including Shevington Moor, Almond Brook, Barracks, and Foxfield; sect. No. 7, the village of Crooke; sect. No. 8, the east side of the canal of the township of Haigh; sect. No. 9, the west side of the canal of the township of Haigh; sect. No. 10, the whole of the township of Worthington. Tenders must be for the term of one year from October 1, 1906, except sect. No. 6, which is for the term of one year from November 1, 1906, and may be for one or more sections; and must be sent in not later than September 19, endorsed "Scavenging," to the Clerk to the Council, Mr. Henry Ackerley, 9, Victoria-buildings, King-street, Wigan.

SEPTEMBER 20.—**Belfast.**—GAS STOVES, ETC.—Belfast Gas Committee invite tenders for the supply of gas cookers, heating stoves, and other appliances, for one year from October 1, 1906. Tenders, endorsed "Tenders for Gas Appliances," addressed to Sir Samuel Black, Town Clerk, Belfast, are to be furnished not later than September 20.

SEPTEMBER 22.—**Blackrock.**—ELECTRIC INSTALLATION.—Blackrock and Kingstown Main Drainage Board invite tenders for the supply and erection of an electric installation for the transmission of power at Blackrock, Co. Dublin. Specification can be seen, and all particulars, tender forms, etc., can be obtained, at the Local Engineer's office, Town Hall, Blackrock, at 11 a.m. and 3 p.m. each day, except Saturdays, or by appointment. Sealed tenders, on official forms only, endorsed "Tender for Electric Installation," and accompanied by schedule of prices, must be lodged with Mr. P. C. Doyle, Secretary, Blackrock and Kingstown Main Drainage Board's Offices, Town Hall, Blackrock, Co. Dublin, before 3 p.m. on September 22.

SEPTEMBER 27.—**Blackrock.**—BOOK SHELVES.—The Library Committee invite tenders for the supply and erection of book shelves, size about 12 ft. by 10 ft. Particulars can be obtained on application at the Library any day, except Saturday, at 10 a.m. or 3 p.m. Tenders, in sealed envelopes, and endorsed "Tenders for Shelving," addressed to Mr. T. A. Murphy, St. Joseph's, Booterstown, must be lodged with him on or before 4 p.m., September 27. All materials to be, as far as possible, of Irish manufacture.

SEPTEMBER 29.—**Stourton.**—FENCING.—The Rothwell U.D.C. invites tenders for providing and erecting 490 yds. of creosoted red-wood fencing, 6 ft. high, round the New Sewage Disposal Works at Stourton. Also separate tenders for about 9 yds. of iron fencing, 5 ft. high, including fixing at the works. Plans and specifications can be seen, and particulars obtained, at the offices of the engineer, Mr. E. J. Silcock, M.Inst.C.E., 10, Park-row, Leeds. Sealed tenders, endorsed "Stourton Fencing" or "Iron Fencing," must be delivered to Mr. W. Dodgson, Clerk to the Council, Council Offices, Rothwell, near Leeds, not later than September 29.

PAINTING, etc.

SEPTEMBER 15.—**Bradford.**—PAINTING, ETC.—Tenders for painting and decorating the Bradford Trades Hall. Specifications from the Curator. Tenders to be in by September 15.

SEPTEMBER 15.—**Bradford.**—PAINTING, ETC.—The Guardians of the North Bierley Union invite tenders for the painting, papering, etc., required to be done at their offices, 4, Town Hall-street, Bradford. Particulars can be obtained on application to Mr. J. E. Helmsley, Clerk to the Guardians, 4, Town Hall-street, Bradford. Tenders, endorsed "Painting," to be sent in on or before September 15.

SEPTEMBER 17.—**Belfast.**—PAINTING, ETC.—The Directors of the Great Northern Railway Company (Ireland) invite tenders for outside cleaning and painting the porter store and stables, etc., at Grosvenor-street Goods Station, Belfast. The specification can be seen at the office of Mr. W. H. Mills, Engineer-in-Chief, Amiens-street terminus, Dublin, or copy of same at the office of the District Engineer, Belfast, and form of tender can be obtained at either office on payment of 1s. each (not returnable). Tenders, made out on the forms supplied by the Company and endorsed "Tender for Painting," must be lodged with Mr. T. Morrison, Secretary, Secretary's Office, Amiens-street terminus, Dublin, not later than 10 a.m. on September 17.

SEPTEMBER 17.—**Shardlow.**—PAINTING, ETC.—The Guardians of the Shardlow Union invite tenders for painting and decorating to be done at their Workhouse, Shardlow, in accordance with specification, which may be seen at the office of Mr. J. W. Newbold, Clerk to the Guardians, any week-day, except Saturday, between the hours of 9 a.m. and 5 p.m. Tenders, endorsed "Painting and Decorating," to be sent to reach the Clerk at the Board-room, Shardlow, not later than 9 a.m. on September 17.

SEPTEMBER 19.—**Bootle.**—PAINTING.—The Corporation of Bootle invite tenders for painting the railings, gates, etc., at the North Recreation Ground and Morton Garden. Specification may be seen, and forms of tender obtained, at the office of the Borough Engineer. Tenders (sealed and endorsed "Painting, (1) North Recreation Ground, (2) Morton Garden") must be sent to Mr. J. Henry Farmer, Town Clerk, Town Hall, Bootle, not later than 10 a.m. on September 19.

SEPTEMBER 20.—**Mitcham.**—PAINTING.—Croydon R.D.C. invite tenders for repairs and painting required at the Isolation Hospital, Beddington Corner, Mitcham. Copies of specifications and forms of tender can be obtained at the office of the Council's Surveyor, Mr. R. M. Chart, F.S.I., on payment of a deposit of 1*l.* Tenders to be delivered to Mr. E. J. Gowen, Clerk of the Council, Town Hall, Croydon, before 12 o'clock noon on September 20.

SEPTEMBER 24.—**Leeds.**—LIMEWASHING, ETC.—The Sanitary Committee invite tenders for cleaning paintwork and limewashing at the depôt in Dock-street. For particulars and forms of tender apply to the Superintendent, Dock-street Depôt. Tenders, endorsed "Limewashing," to be delivered at the Town Clerk's Office by 10 a.m. on September 24.

SEPTEMBER 26.—**Hull.**—PAINTING, ETC.—The Corporation invite tenders for the cleansing, painting, etc., required at the new Central Police-station, Alfred Gelder and Parliament streets. Forms of tender and other particulars may be obtained from Mr. Joseph H. Hirst, City Architect, Town Hall, Hull. Tenders, endorsed "Tender for Cleansing and Painting New Central Police-station," are to be addressed to the Chairman of the Station House Sub-Committee, and delivered at the Town Clerk's Office, Hull, before 10 o'clock on September 26.

ROADS, SANITARY, AND WATER WORKS.

SEPTEMBER 15.—**Devonport.**—LEVELLING AND PAVING.—The Council of the County Borough of Devonport invite tenders for levelling, paving, and completing the following lanes, viz.:—Contract 95—lane between Maristow and Cotehele avenues (sect. 2); contract 96—lane between Maristow and parts of St. Aubyn and St. Michael avenues; contract 98—lane rear of Monument-street; contract 101—lane between Herbert-place and Haddington-road; contract 105—lane between Ocean-street and Renown-street (sect. 1). Plans, specifications, and conditions may be seen, and forms of tender and bills of quantities obtained, at the Borough Surveyor's Office, Municipal Offices, 29, Ker-street, Devonport, on payment of 1*l.* 1s. for each set of quantities. Separate sealed tenders, addressed to Mr John F. Burns, Borough Surveyor, Municipal Offices, 29, Ker-street, Devonport, must be delivered on or before 12 noon of September 15.

SEPTEMBER 17.—**Houghton-le-Spring.**—FOOTPATH FLAGGING.—The U.D.C. of Houghton-le-Spring invite tenders for laying about 370 sq. yds. of concrete flagging in Newbottle-street. Specification may be seen at the office of Mr. J. W. Holbrook, surveyor, 14A, Church-street, Houghton-le-Spring, between 12 and 1 p.m., and 4 and 5 p.m. Tenders to reach Mr. D. Miller, Clerk of the Council, Houghton-le-Spring, before noon on September 17.

SEPTEMBER 18.—**Blaina.**—DRAINAGE RECONSTRUCTION, ETC.—Monmouthshire Education Committee invite tenders for the reconstruction of the drainage and the erection of a lavatory at Blaina Central School. Plans and specifications may be seen at the office of Mr. R. L. Roberts, M.S.A., Abercarn. Quantities supplied. Sealed tenders, endorsed "Tender for Drainage, etc., Blaina Central School," are to be delivered to Mr. C. Dauncey, Clerk of the Group, C.C. Offices, Newport, not later than September 18.

SEPTEMBER 19.—**Birmingham.**—MAKING-UP ROAD.—The Public Works Committee are prepared to receive tenders for excavating, laying concrete foundation, and paving with wood the carriageway of Harborne-road, between Greenfield-crescent and Chad-road. The wood blocks will be provided by the Corporation. The drawings and specification may be inspected, and quantities and forms of tender obtained, on deposit of 2*l.*, at the offices of Mr. Henry E. Stilgoe, M.Inst.C.E., City Engineer and Surveyor, The Council House, Birmingham. The contractor whose tender is accepted will be required to pay not less than the minimum standard rate of wages current in the district. Tenders, sealed and endorsed "Wood Pavement, Harborne-road," to be delivered at the City Surveyor's Office, Council House, on or before September 19.

SEPTEMBER 19.—**Moseley.**—ROAD WORKS.—King's Norton and Northfield U.D.C. invite tenders for the making good of St. Alban's-road, Moseley. Bills of quantities and forms of tender may be obtained, and plans and specifications seen, at the office of the Engineer and Surveyor to the Council, Mr. Ambrose W. Cross, A.M.Inst.C.E., No. 23, Valentine-road, King's Heath, on payment of a deposit of 1*l.* 1s. Sealed tenders, endorsed "Tender for Making Good St. Alban's-road," must be sent not later than 12 o'clock noon, September 19, to Mr. Edwin Docker, Clerk to the Council, 10, Newhall-street, Birmingham.

SEPTEMBER 20.—**Clayton.**—CONSTRUCTION OF SEWER.—The Clayton U.D.C. invite tenders for the construction of about 140 yds. of 9-in. earthenware pipe sewer. Drawings and specifications may be seen, and forms of tender obtained, at the office of the Clayton U.D.C. on any morning from 8.45 to 9.30, up to and including September 20. The contractor whose tender is accepted will be required to pay the standard rate of wages. Sealed tenders, endorsed "Cobden-street Sewerage," are to be forwarded to Mr. Benjn. Ashton, Clerk, not later than September 21.

SEPTEMBER 22.—**Hartwell.**—WATER SUPPLY WORKS.—The Potterspury R.D.C. invite tenders to execute works of water supply for the Parish of Hartwell. The works include the erection of a wind engine pump, the laying of about one mile of 2-in. cast-iron rising main, and about 1,250 yds. of 3-in. distributing mains, the construction of a reservoir to hold 15,000 galls., and the erection of stand pipes, etc. Specifications and general conditions, with forms of detailed estimate and tender, may be obtained of the undersigned on deposit of 1*l.* Sealed tenders, endorsed "Hartwell Water Supply," to be sent to Mr. W. J. Treadwell, engineer and surveyor, Middleton Cheney, Banbury, not later than September 22.

SEPTEMBER 24.—**Billesley.**—SEWERS, ETC.—Yardley R.D.C. invite tenders for the provision and construction of the following foul-water sewers and drains, viz.:—178 yds. of 12-in. sewer in Stoney-lane, Coldbath; 678 yds. of 12-in. sewer in Coldbath-road, Billesley; 129 yds. of 9-in. sewer in Coldbath-road, Billesley; 699 yds. of 9-in. sewer in Brook-lane; 599 yds. of 9-in. sewer in Stoney-lane, Coldbath; 67 yds. of 9-in. sewer in Stoney-lane, Billesley; 300 yds. of 9-in. sewer in Windermere-road, Coldbath; 195 yds. of 9-in. sewer in Dyott-road, Wake Green; 148 yds. of 9-in. sewer in St. Agnes-crescent, Wake Green; 312 yds. of 9-in. sewer in St. Agnes-road, Wake Green; 200 yds. of 9-in. sewer in Hayfield-road, Wake Green; together with manholes, flushing chambers, and other works appertaining thereto, in accordance with plans, drawings, specification, and conditions of contract, which may be seen on and after September 18, on application to the Engineer and Surveyor, Mr. Arthur W. Smith, at the Council House, Sparkhill, near Birmingham, between the hours of 10 and 1 and 3 and 5 (Saturdays, 10 and 1). Specification, bill of quantities, and form of tender can be obtained on payment of 3*l.* 3s. to Mr. Francis Ladbury Thompson, Clerk of the Council, The Council House, Sparkhill, near Birmingham, to whom tenders, endorsed "Billesley Sewerage," must be delivered not later than noon, September 24.

SEPTEMBER 24.—**Liverpool.**—ROAD MAKING, DRAINAGE, ETC.—The Select Vestry of this Parish invite tenders for certain works of road making and drainage in connexion with buildings now in course of erection at Olive-mount, Wavertree, according to plans and specifications to be seen at the office of the architect, Mr. Edmund Kirby, 5, Cook-street, Liverpool, between the hours of 10 o'clock a.m. and 5 o'clock p.m. Bills of quantities, conditions of contract, and forms of tender (upon which alone offers will be received) may be obtained at 5, Cook-street, on payment of a deposit of 2*l.* Sealed tenders must

be delivered to Mr. H. J. Hagger, Vestry Clerk, Parish Offices, Brownlow-hill, not later than September 24.

SEPTEMBER 24.—**Otley.**—STREET WORKS.—Tenders are required for the sewering, paving, and making good of Back Garnett-street, Otley. Drawings and specification may be seen at the offices of Mr. J. E. Sharpe, Engineer and Surveyor, Council Offices, Otley, where quantities may also be obtained on depositing cheque for 1*l.* 1s., and to whom sealed and endorsed tenders must be delivered at the office not later than 2 p.m., September 24.

SEPTEMBER 25.—**Gateshead.**—PAVING, ETC.—Tenders are invited for paving, etc., the following streets, viz.:—(1) Pitt-street; (2) Orton-street; (3) back Orton-street East; (4) back Orton-street West. Plans and specifications may be seen, and quantities obtained, at the office of Mr. N. P. Pattinson, Borough Engineer, Town Hall. Tenders are to be sent in, sealed and endorsed "Tender for Street Paving," on or before 2 p.m. on September 25.

SEPTEMBER 27.—**Ebbw Vale.**—ROAD WORKS.—The Ebbw Vale U.D.C. invite tenders for the work required in widening Libanus-road and the approach road to Sunny Bank Houses and Mount Pleasant-road. Plan and specification may be seen, and form of tender, with bill of quantities, obtained, by appointment at the office of Mr. T. J. Thomas, the Town Surveyor. A deposit of 10s., which must be made in postal orders, will be required from each person who obtains a copy of the form of tender and bill of quantities. Tenders, enclosed in a sealed envelope, endorsed on the outside "Tender for Libanus-road Improvement," must be delivered at the office of Mr. Tho. Hughes, Clerk, not later than September 27.

OCTOBER 1.—**Teddington.**—PRIVATE STREET WORKS.—The U.D.C. of Teddington invite tenders for the following works in connexion with the making-up of Munster-road, in the Parish of Teddington, viz.:—3,862 super. yds. of roadway forming and metalling; 1,015 lin. yds. of kerbing; 1,015 lin. yds. of channelling; 2,312 super. yds. of tarpaving. Plan and specifications may be seen, bills of quantities and forms of tender obtained (on payment of 2*l.* 2s.), on application to Mr. M. Hainsworth, surveyor, Elmfield House, Teddington. Tenders will not be considered unless made out on the forms provided. Sealed tenders, endorsed "Private Street Works," must reach Mr. G. H. Salmons, Clerk, Elmfield House, Teddington, not later than noon on October 1.

OCTOBER 2.—**Bangor.**—RESERVOIR, ETC.—The U.D.C. of Bangor (Co. Down) invite tenders for the construction of a reservoir and auxiliary works at Ballysallagh Major, about four miles from the Town Hall, Bangor; also the laying of a line of 12-in. pipes from the intended reservoir to Bangor Urban District boundary. Tenders to be framed as follows:—Firstly—the contractor to execute all work and to supply all pipes, ironwork, and other materials; secondly—the contractor to execute all work and supply all materials other than the pipes and ironwork, which will be supplied to him at Bangor by the U.D.C.; thirdly—ironfounders to supply and deliver at Bangor all iron and steel work, pipes, and valves, as described in specification and schedules. Plans and specification of the intended works may be seen at the office of Messrs. L. L. Macassey & Sons, 7, Chichester-street, Belfast. Quantities for the intended works may be obtained from Mr. S. C. Hunter, Scottish Provident Buildings, Belfast, from whom also a copy of the specification may be had on a deposit of 5*l.* 5s. Tenders, accompanied by priced bills of quantities, and specification to be lodged with Mr. James Milliken, Town Clerk, at the Town Hall, Bangor, not later than 12 o'clock noon, October 2.

OCTOBER 2.—**Greenhead.**—NEW TANK AND FILTERS.—The Irvine and District Water Board invite tenders for the construction of a covered clear-water tank, two additional filter beds, inspection house and meter chamber, boundary walls, the providing, laying, and jointing of cast-iron and fire-clay pipes, and other relative works at Greenhead filtering station, Parish of Stevenston. Drawings may be seen at the office of the Superintendent, Mr. James Clarkson, Burgh Chambers, Irvine, and copies of the specification and schedule of quantities may be obtained from him on payment of 1*l.* 1s. An assistant will meet intending contractors at Kilwinning, G. and S.W. Railway Station, on September 18, at 11.15 a.m., to point out site of works. Sealed offers, endorsed "Tender for Tank and Filters," to be lodged with Mr. James Campbell, jun., Secretary, Bank of Scotland, Saltcoats, not later than October 2.

OCTOBER 2.—**Moreton-in-the-Marsh.**—SEWAGE WORKS.—Chipping Campden R.D.C. invite tenders for the provision, laying, and jointing of cast-iron and stoneware pipe sewers, together with manholes and lampholes, construction of pump well, engine-house, liquefying tanks, and other incidental works, in accordance with the drawings and specification, which may be seen, and bills of quantities and form of tender obtained, at the offices of the engineers, Messrs. Willcox & Raikes, 63, Temple-row, Birmingham, on payment of a deposit of 3*l.* 3s. Sealed tenders, in envelopes supplied, endorsed "Moreton-in-the-Marsh Sewerage—Contract No. 1," to be delivered to Mr. Oliver H. New, Clerk to the Council, Chipping Campden, not later than 12 o'clock noon on October 2.

✱ OCTOBER 4.—**Bromley.**—ROAD MAKING.—The Councils of Bromley, Beckenham, etc., invite tenders for certain works of sewering, levelling, paving, metalling, channelling, and making good Hayes-road. Plans and sections may be seen, and specifications, bills of quantities, and forms of tender obtained, at the office of the Borough Engineer, Bromley, Kent, on payment of 1*l.* 1s. Tenders, endorsed "Tender for Hayes-road," must be delivered to the Clerk of the Bromley R.D.C., Park House, Beckenham-lane, Bromley, Kent, not later than October 4.

✱ NOVEMBER 8.—**Capetown.**—ASPHALTE PAVING.—The agents for the City of Capetown Corporation are prepared to receive tenders for supplying and laying asphalte paving in Long-street and Darling-street, and maintaining same for twelve months. Specification may be seen, and forms of tender, etc., obtained, upon application to Messrs. Davis & Soper, 54, St. Mary-axe, E.C., to whom samples must be delivered not later than 4 o'clock p.m., November 1, and sealed tenders, endorsed "Tender for Asphalte Paving," must be delivered not later than 4 o'clock, November 8.

STONE, MATERIALS, AND STORES.

SEPTEMBER 17.—**Newcastle-upon-Tyne.**—UNDERGROUND CONVENIENCE.—The Corporation of Newcastle-upon-Tyne invite tenders for the construction of an underground public convenience in the Haymarket. On payment, by contractors, of 2*l.* 2s. to the City Treasurer, specifications, conditions, bills of quantities, and form of tender can be obtained, and drawings inspected, at the City Engineer's Office, Town Hall, Newcastle. Tenders, addressed to the "Sanitary Committee, Committee Clerk's Office, Town Hall, Newcastle-upon-Tyne," to be sent in before noon on September 17.

SEPTEMBER 18.—**Rochester.**—STORES, ETC.—The Corporation invite tenders for the supply of the following for the twelve months ending September 29, 1907, viz.:—(1) Tools; (2) horse hire; (3) Portland cement; (4) forage; (5) curbs and paving materials. Specification and form of tender can be obtained from Mr. William Banks, A.M.Inst.C.E., City Surveyor, Guildhall, Rochester. Sealed tenders, endorsed "Tender for ——," are to be delivered to Mr. Apsley Kennette, Town Clerk, Guildhall, Rochester, before 4 o'clock, September 18.

SEPTEMBER 20.—**Pentre Rhondda.**—PIPES, TUBES, ETC.—Rhondda U.D.C. invite tenders for the following:—Contract No. 7—lead and compo pipe and block tin; contract No. 8—wrought-iron tubes and fittings; contract No. 15—haulage at Pentre, Llwynypia, and Porth; contract No. 41—erection of boundary wall at Blaenclydach storage tank; contract No. 42—repairing Cornish boiler at Porth Gasworks. Forms of tender for contracts No. 7, 8, and 15 may be obtained on application. Plans and specifications may be seen for contracts No. 41 and 42, and forms of tender supplied, upon application to Mr. Octavius Thomas, the Engineer and Manager, Gas and Water Offices, Pentre Rhondda, upon depositing the sum of 1*l.* 1s. No form of tender other than that issued by the Council will be accepted. The contractors will be required to pay the current rate of wages ruling in the district. Tenders to be addressed to the Chairman of the Gas and Water Committee, endorsed "Contract No. 7, etc.," and delivered to Mr. Walter P. Nicholas, Clerk to the Council, Council Offices, Pentre, Rhondda, on or before 10 a.m. on September 20.

SEPTEMBER 22.—**Manchester.**—TERRA COTTA.—Manchester Education Committee invite tenders for the supply of terra cotta for the Oswald-road Municipal School, Chorlton-cum-Hardy, Manchester. Plans may be seen, and a copy of the bill of quantities (including specification) obtained, at the offices in Deansgate, Manchester, on a deposit of 1*l.* 1s. Cheques to be made payable to the Accountant, Education Offices, Deansgate, Manchester. Tenders, on the forms and in the envelopes provided, must be delivered at the Deansgate Offices of the Education Committee not later than September 22.

✱ SEPTEMBER 25.—**Edmonton.**—GRANITE.—The Edmonton U.D.C. invite tenders for supply of blue Guernsey and Aberdeen granite for the period between September 29, 1906, and September 30, 1907. Forms of tender and full particulars may be obtained of Mr. G. Eedes, Eachus, Council's Engineer, Town Hall, Edmonton. Sealed tenders on form supplied, endorsed "Tender for Granite," to be delivered to Mr. Wm. Francis Payne, Town Hall, Edmonton, not later than 12 noon, September 25.

✱ SEPTEMBER 25.—**Edmonton.**—PORTLAND CEMENT.—The Edmonton U.D.C. invite tenders for the supply and delivery at the Edmonton Low Level or Angel-road Station of the G.E.R., or by barge at the Council's Wharf on the River Lee, navigation of Portland cement as and when required by the Council for the period between September 29, 1906, and September 30, 1907. Forms of tender and full particulars may be obtained of Mr. G. Eedes Eachus, Council's Engineer, Town Hall, Edmonton. Sealed tenders, on form supplied, endorsed "Tender for Cement," to be delivered to Mr. Wm. Francis Payne, Town Hall, Edmonton, not later than 12 noon, September 25.

✱ SEPTEMBER 25.—**Edmonton.**—STONEWARE PIPES.—The Edmonton U.D.C. invite tenders for the supply and delivery at the Edmonton Low Level Station on the G.E.R., or at the Town Hall Yard, of stoneware pipes for six months ending March 31, 1907. Forms of tender and full particulars may be obtained on application to Mr. G. Eedes, Eachus, Council's Engineer, Town Hall, Edmonton. Sealed tenders, on form supplied, endorsed "Tender for Stoneware Pipes," to be delivered to Mr. Wm. Francis Payne, Town Hall, Edmonton, not later than 12 noon, September 25.

✱ SEPTEMBER 25.—**Hanwell.**—BROKEN GRANITE.—The Hanwell U.D.C. are prepared to receive tenders for supply of 1½-in and 2-in. hand-broken Guernsey, Channel Island, or Clee Hill granite for the period ending March 31, 1907. Forms of tender, contract, etc., may be inspected at Council's office after Monday, September 17, between 10 a.m. and 5 p.m. Tenders, sealed and endorsed "Tender for Broken Granite," to be delivered to the Clerk, Council Offices, Cherington-road, Hanwell, W., not later than 12 noon, September 25.

SEPTEMBER 25.—**London.**—STORES.—The Directors of Bombay, Baroda, and Central India Railway Company invite tenders for the supply of the following stores, viz.:—Class A—(1) Eyebolts and strand wire, for fencing; (2) pillars, posts, etc., for fencing; (3) accumulator cells, etc.; (4) axles for carriages and waggons; (5) india-rubber fittings; (6) steel boiler tubes; (7) tyres for carriages; (8) tyres for engines; (9) cast-steel engine wheel centres; (10) copper plates and rods; (11) brass boiler tubes. Class B—(1) Panel Plates. Class C—(1) Tube ferrules. Tenders must be made on forms, copies of which, with specifications, can be obtained from Mr. W. V. Constable, Secretary, Offices, Gloucester House, 2, 3, and 4, Bishopsgate-street Without, London, E.C., on payment as follows:—For class A 21s. each, for class B 10s. 6d. each, and for class C 5s. each (which will not be returned).

SEPTEMBER 26.—**Aberdeen.**—STORES.—Tenders are wanted for supplying, for the ordinary harbour works, the following articles for one year, from November 1, 1906, to October 31, 1907, inclusive, viz.:—No. 1, steel and iron; No. 2, ironmongery; No. 3, crane chains; No. 4, cast-iron work; No. 5, timber; No. 6, chandlery; No. 7, plumber work; No. 8, brass and copper work; No. 9, indiarubber and asbestos; No. 10, painter work; No. 11, ropes and yarn; No. 12, stones and road metal; No. 13, bricks and drain-pipes; No. 14, oils; No. 15, slates; No. 16, coals; No. 17, carting and sand; No. 18, books and stationery; No. 19, printing; No. 20, coal, lime, and other measures; No. 21, ropes, etc., for the salmon fishings. All according to schedules, which will be delivered to intending contractors at the Harbour Engineer's Office, Aberdeen. Sealed tenders, addressed to the Aberdeen Harbour Commissioners, and endorsed, are to be lodged with Mr. R. Gordon Nicol, Harbour Engineer, on or before September 26.

SEPTEMBER 27.—**Romford.**—GRANITE.—The Romford U.D.C. invite tenders for the supply of 1,500 tons of blue Guernsey granite, broken to 1½ in. cube. The granite to be delivered free at Romford Station at such times and in such quantities as the Council may require before March 31, 1907. A contract and bond, with sufficient sureties, will have to be entered into and given by the person or persons whose tender may be accepted. Tenders (with samples, and marked "Tender for Granite") to be sent to Mr. Charles T. King, Clerk, Council Offices, Romford, on forms to be obtained from the surveyor on or before September 27.

✱ OCTOBER 11.—**Capetown.**—WOOD BLOCKS.—The agents for the City of Capetown Corporation are prepared to receive tenders for the supply of creosoted red deal blocks, also Australian and other hard wood blocks. Blocks to be 5 in. deep, 3 in. wide, 9 in., 8 in., and 7 in. long. Specifications may be seen, and form of tender obtained, upon application to Messrs. Davis & Soper, 54, St. Mary-axe, E.C., to whom samples are to be seen, not later than 4 p.m., October 4, and tenders, endorsed "Tender for Supply of Wood Blocks," to be delivered not later than 4 o'clock p.m., October 11.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*CIVIL ENGINEER	Newcastle, Co. Down U.D.C.	Not stated	Sept. 22
*VISITING OR OCCASIONAL TEACHERS	London County Council	(See advertisement in this issue)	Sept. 24

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*BRICK-MAKING PLANT—Abbey Brickfields, Faversham	Jackson & Sons	Sept. 18
*FREEHOLD BUILDING LAND, SHREWSBURY—The County Mart, Shrewsbury	Wm. Hall, Wateridge, & Owen	Sept. 28
*FREEHOLD PROPERTY, SHOREDITCH—At the Mart	Reynolds & Eason	do.
*JOINERY WORKS, HENRY-STREET, GRAY'S-INN-ROAD	May & Rowden	Oct. 3

PATENTS.—*Continued from page* 330.

22,787 of 1905.—G. WATSON: *Manufacture of Bricks from Clinker and Lime.*

This relates to a machine for mixing and slaking clinker and lime, comprising a mixing chamber, beaters revolving therein, and means for adjustably inclining the chamber to effect and control the travel of the mixture therethrough.

21,933 of 1905.—R. GRIMM: *Sectional Girders and Columns formed of Concrete strengthened with Iron.*

This relates to girders and columns formed in sections of concrete strengthened with iron members, the various sections of which can be readily put together, and can be easily taken to pieces, wherein the concrete body of each sectional part, at those places where the ends of the iron inlays or tie bars are situated, is formed with recesses so that the ends are thus exposed and can be readily connected together.

6,725 of 1906.—M. J. ADAMS: *Closet Seats.*

This relates to a combined closet basin and seat, the latter being composed of pulp or other suitable non-conducting material, attached to a suitably perforated rim of the closet basin and forming an integral part thereof.

12,496 of 1906.—A. S. DOUGLAS and A. DOUGLAS: *Earth or Ash Closet Doors.*

This relates to an earth or ash closet door, comprising a frame having its top wider than its bottom, the sides being provided with instanding ribs sloping downwards from near the front of the top to near the back of the bottom, suitable studs being provided in front of the ribs to furnish a space to receive the sides of a suitably shaped door.

7,634 of 1906.—C. DODSON: *Sliding Sashes.*

This relates to a clamping device for securing a sliding sash in any desired position and effecting a fluid tight joint along its side edges, comprising a rigid strip secured to the window frame, a plate spring secured to the sliding sash, and means for drawing the plate spring into close contact with the rigid strip, said means comprising a spill passing through the sash and secured at one end to a plate spring, and a cam handle pivotally mounted on the other end of the spill and adapted to bear against the face of the sash or a plate thereon.

16,841 of 1905.—W. RICHARDS: *Cement for Attaching Glass or Pottery Tiles of Bricks, Walls, and other Surfaces.*

This relates to a cement for attaching glass or pottery tiles to bricks, walls, and other surfaces, consisting of a base formed by the admixture with oil of the following ingredients, namely, mastic, a cement such as Parian or Keen's cement, a binding material such as whitening, fine sand, and ground glass.

21,019 of 1905.—H. COULTHURST, J. COULTHURST, and A. COULTHURST: *Apparatus employed in the Manufacture of Earthenware and like Pipes.*

This relates to apparatus employed in the manufacture of earthenware and like pipes, and consists of two platforms carried by side frames as hitherto. The said frames are mounted in trunnions supported by screws working in suitable side standards or supports. The platforms are secured to the said frames by means of bolts passing through lugs on the platforms and through slots in the side frames so that the distance between the two platforms may be adjusted to suit the length of tie being manufactured. Secured to the inner sides of the side frames, about mid-way of their length, are suitable brackets forming nuts in or through which work screws connected at their inner ends to an adjustable curved saddle or cradle which occupies a position substantially central to the apparatus.

MEETINGS.

FRIDAY, SEPTEMBER 14.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. Priestley on "Sanitary Law"—III. 7 p.m.

SATURDAY, SEPTEMBER 15.

Architectural Association.—Week-end visit to Chichester.

Northern Architectural Association.—Excursion meeting. Members to assemble at Heaton-road Tramway terminus at 3 p.m. St. Gabriel's and St. Mark's Churches, and the tramcar sheds, will be visited.

MONDAY, SEPTEMBER 17.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Dr. G. Newman on "Duties of a Sanitary Inspector"—I. 7 p.m.

WEDNESDAY, SEPTEMBER 19.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Dr. G. Newman on "Duties of a Sanitary Inspector"—II. 7 p.m.

Institute of Sanitary Engineers.—Opening sessional meeting, Holborn Restaurant. 7.30 p.m.

Provident Institution of Builders' Foremen and Clerks of Works.—Quarterly meeting of the directors. 7 p.m. Ordinary meeting of the members. 8 p.m.

FRIDAY, SEPTEMBER 21.

Royal Sanitary Institute (Lectures for Sanitary Officers).—Dr. G. Newman on "Duties of a Sanitary Inspector"—III. 7 p.m.

SATURDAY, SEPTEMBER 22.

Junior Institution of Engineers.—Visit the Knight, Bevan, and Sturge Portland Cement Works of the Associated Portland Cement Manufacturers. Train leaves Charing Cross at 1.25 p.m. for Northfleet.

Institute of Sanitary Engineers.—Visit to Hampton Sewage Works.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 10 0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1 7 0	" " "
Picked Stocks for Facings	2 17 6	" delivered.
Flettons	1 8 0	" at railway depôt.
Red Wire Cuts	1 14 0	" " "
Best Fareham Red	3 12 0	" " "
Best Red Pressed Ruabon Facing	5 0 0	" " "
Best Blue Pressed Staffordshire	3 15 0	" " "
Do. Bullnose	4 0 0	" " "
Best Stourbridge Fire Bricks	3 14 0	" " "
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers	12 0 0	" " "
Headers	11 0 0	" " "
Quoins, Bullnose, and Flats	16 0 0	" " "
Double Stretchers	19 0 0	" " "
Double Headers	16 0 0	" " "
One Side and two Ends	19 0 0	" " "
Two Sides and one End	20 0 0	" " "
Splays, Chamferred, Squints	20 0 0	" " "
Best Dipped Salt Glazed Stretchers, and Header	12 0 0	" " "
Quoins, Bullnose, and Flats	14 0 0	" " "
Double Stretchers	15 0 0	" " "
Double Headers	14 0 0	" " "
One Side and two Ends	15 0 0	" " "
Two Sides and one End	15 0 0	" " "
Splays, Chamferred, Squints	14 0 0	" " "
Second Quality White and Dipped Salt Glazed	2 0 0	" less than best.
Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	5 6	" "
Best Portland Cement	27 0	per ton, "
Best Ground Blue Lias Lime	19 0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

	s. d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½	" "
PORTLAND STONE (20 ft. average)—		
Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 1	" "
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 2½	" "

	s. d.	
Ancaster in blocks	1 10	per ft. cube, deld. rly. depôt.
Beer "	1 6	" "
Greenshill "	1 10	" "
Darley Dale in blocks	2 4	" "
Red Corsehill "	2 2	" "
Closeburn Red Freestone	2 0	" "
Red Mansfield "	2 4	" "

STONE (*continued*).

	s. d.	
YORK STONE—*Robin Hood Quality.*		
Scappled random blocks	2 10	per ft. cube, deld. rly depôt.
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per ft. super., "
6 in. rubbed two sides ditto, ditto	2 6	" "
3 in. sawn two sides slabs (random sizes)	0 11½	" "
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½	" "
1½ in. to 2 in. ditto, ditto	0 6	" "
HARD YORK—		
Scappled random blocks	3 0	per ft. cube, "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 8	per ft. super., "
6 in. rubbed two sides ditto	3 0	" "
3 in. sawn two sides slabs (random sizes)	1 2	" "
2 in. self-faced random flags	0 5	" "

	s. d.	
Hopton Wood (Hard Bed) in blocks	2 0	per ft. cube, deld. rly. depôt.
" " " 6 in. sawn both sides landings	2 7	per ft. super. deld. rly. depôt.
" " " 3 in. sawn both sides random slabs	1 0	" "
" " " 2 in. do.	0 8½	" "

SLATES.

In. In.	£ s. d.	
20×10 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
20×12 " "	13 17 6	" "
20×10 first quality "	13 0 0	" "
20×12 " "	13 15 0	" "
16×8 " "	7 5 0	" "
20×10 best blue Portmadoc	12 12 6	" "
16×8 " "	6 12 6	" "
20×10 best Eureka unfading green	15 17 6	" "
20×12 " "	18 7 6	" "
18×10 " "	13 5 0	" "
16×8 " "	10 5 0	" "
20×10 permanent green	11 12 6	" "
18×10 " "	9 12 6	" "
16×8 " "	6 12 6	" "

TILES.

	s. d.	
Best plain red roofing tiles	42 0	per 1000 at rly. depôt.
Hip and Valley tiles	3 7	per doz. "
Best Broseley tiles	50 0	per 1000 "
Do. Ornamental tiles	52 6	" "
Hip and Valley tiles	4 0	per doz. "
Best Ruabon red, brown, or brindled do. (Edwards)	57 6	" "
Do. Ornamental do.	60 0	" "
Hip tiles	4 0	per doz. "
Valley tiles	3 0	" "
Best Red or Mottled Staffordshire do. (Peakes)	51 9	per 1000 "
Do. Ornamental do.	54 6	" "
Hip tiles	4 1	per doz. "
Valley tiles	3 8	" "
Best "Rosemary" brand plain tiles	48 0	per 1000 "
Best Ornamental tiles	50 0	" "
Hip tiles	4 0	per doz. "
Valley tiles	3 8	" "
Best "Hartshill" brand plain tiles, sand-faced	50 0	per 1000 "
Do pressed	47 6	" "
Do. Ornamental do.	50 0	" "
Hip tiles	4 0	per doz. "
Valley tiles	3 6	" "

WOOD.

BUILDING WOOD.	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13 10 0	... 15 0 0
Deals: best 3 by 9	13 0 0	... 14 0 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 0 0	... 12 0 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best.
Battens: seconds	0 10 0	" "
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	... 10 0 0
2 in. by 4½ in. and 2 in. by 5 in.	8 10 0	... 9 10 0
Foreign Sawn Boards— 1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.
¾ in.	1 0 0	"

	At per load of 50 ft.	
Fir timber: best middling Danzig or Memel (average specification)	4 10 0	... 5 0 0
Seconds	4 0 0	... 4 10 0
Small timber (8 in. to 10 in.)	3 12 6	... 3 15 0
Small timber (6 in. to 8 in.)	3 0 0	... 3 10 0
Swedish balks	2 10 0	... 3 0 0
Pitch-pine timber (30 ft. average)	4 0 0	... 4 15 0

JOINERS' WOOD.	At per standard.	
White Sea: first yellow deals, 3 in. by 11 in.	24 0 0	... 25 0 0
3 in. by 9 in.	22 0 0	... 23 0 0
Battens, 2½ in. and 3 in. by 7 in.	6 10 0	... 18 0 0
Second yellow deals, 3 in. by 1 in. 3 in. by 9 in.	18 10 0	... 20 0 0
" Battens, 2½ in. and 3 in. by 7 in.	17 10 0	... 19 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	13 10 0	... 14 10 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	... 15 0 0
Petersburg first yellow deals, 3 in. by 11 in.	11 0 0	... 12 0 0
Do. 3 in. by 9 in.	21 0 0	... 22 10 0
Battens	18 0 0	... 19 10 0
Second yellow deals, 3 in. by 11 in.	13 10 0	... 15 0 0
Do. 3 in. by 9 in.	16 0 0	... 17 0 0
Battens	14 10 0	... 16 0 0
Third yellow deals, 3 in. by 11 in.	11 0 0	... 12 10 0
Do. 3 in. by 9 in.	13 0 0	... 14 0 0
Battens	12 10 0	... 14 0 0
	10 0 0	... 11 0 0

WOOD (*continued*).

JOINERS' WOOD (*continued*)—	At per standard. £ s. d.		£ s. d.
White Sea and Petersburg—			
First white deals, 3 in. by 11 in.	14 10 0	...	15 10 0
,, ,, 3 in. by 9 in.	13 10 0	...	14 10 0
Battens	11 0 0	...	12 0 0
Second white deals, 3 in. by 11 in.	13 10 0	...	14 10 0
,, ,, 3 in. by 9 in.	12 10 0	...	13 10 0
,, ,, battens	10 0 0	...	11 0 0
Pitch-pine: deals	18 0 0	...	21 0 0
Under 2 in. thick extra	0 10 0	...	1 0 0
Yellow Pine—First, regular sizes	44 0 0	upwards.	
Oddments	32 0 0	,,	
Seconds, regular sizes	33 0 0	,,	
Yellow Pine oddments	28 0 0	,,	
Kauri Pine—Planks, per ft. cube	0 3 6	...	0 5 0
Danzig and Stettin Oak Logs—			
Large, per ft. cube	0 3 0	...	0 3 6
Small ,, ,,	0 2 6	...	0 2 9
Wainscot Oak Logs, per ft. cube	0 5 6	...	0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 8½	...	0 0 9½
¾ in. do. do	0 0 7	...	—
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9	...	0 1 0
Selected, Figury, per ft. super. as inch	0 1 6	...	0 2 6
Dry Walnut, American, per ft. super. as inch	0 0 10	...	0 1 0
Teak, per load	17 0 0	...	22 0 0
American Whitewood Planks, per ft. cube	0 4 0	...	0 5 0
Prepared Flooring, etc.—	Per square.		
1 in. by 7 in. yellow, planed and shot	0 13 6	...	0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0	...	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	...	1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	...	0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	...	0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	...	0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	...	0 13 6
1 in. by 7 in. ,, ,,	0 14 0	...	0 18 0
¾ in. by 7 in. white ,, ,,	0 10 0	...	0 11 6
1 in. by 7 in. ,, ,,	0 12 9	...	0 15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.		£ s. d.
Rolled Steel Joists, ordinary sections	7 0 0	...	7 10 0
Compound Girders, ordinary sections	9 0 0	...	10 0 0
Steel Compound Stanchions	12 0 0	...	13 0 0
Angles, Tees, and Channels, ordinary sections	9 0 0	...	10 0 0
Flitch Plates	9 0 0	...	10 0 0
Cast Iron Columns and Stanchions including ordinary patterns	7 10 0	...	8 10 0

METALS.

	Per ton, in London. £ s. d.		£ s. d.
IRON—			
Common Bars	8 0 0	...	8 10 0
Staffordshire Crown Bars, good merchant quality	8 10 0	...	9 0 0
Staffordshire "Marked Bars"	10 10 0	...	—
Mild Steel Bars	8 15 0	...	9 0 0
Hoop Iron, basis price	9 5 0	...	9 10 0
,, ,, Galvanised	17 0 0	...	—
(*And upwards, according to size and gauge.)			
Sheet Iron Black—			
Ordinary sizes to 20 g.	9 10 0	...	—
,, ,, 24 g.	10 10 0	...	—
,, ,, 26 g.	12 0 0	...	—
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	14 0 0	...	—
Ordinary sizes to 22 g. and 24 g.	14 10 0	...	—
,, ,, 26 g.	15 0 0	...	—
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.	17 0 0	...	—
,, ,, 22 g. and 24 g.	17 10 0	...	—
,, ,, 26 g.	19 0 0	...	—
Galvanised Corrugated Sheets—			
Ordinary sizes 6 ft. to 8 ft. 20 g.	14 0 0	...	—
,, 22 g. and 24 g.	14 10 0	...	—
,, 26 g.	15 15 0	...	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11 10 0	...	—
Best Soft Steel Sheets, 22 g. & 24 g.	12 10 0	...	—
,, ,, ,, 26 g.	14 15 0	...	—
Cut Nails, 3 in. to 6 in.	9 10 0	...	9 15 0
(Under 3 in., usual trade extras.)			

LEAD, &c.

	Per ton, in London. £ s. d.		£ s. d.
LEAD—Sheet, English, 3lb. and up.	20 15 0	...	—
Pipe in coils	21 5 0	...	—
Soil pipe	23 15 0	...	—
Compo pipe	23 15 0	...	—
ZINC—Sheet—			
Vieille Montagne ...ton	33 10 0	...	—
Silesian	33 5 0	...	—
COPPER—			
Strong Sheet ...per lb.	0 1 1	...	—
Thin ,, ,,	0 1 2	...	—
Copper nails ,,	0 1 0	...	—
BRASS—			
Strong Sheet ,,	0 1 0	...	—
Thin ,, ,,	0 1 1	...	—
TIN—English Ingots ,,	0 1 9	...	—
SOLDER—Plumbers' ,,	0 0 8½	...	—
Tinmen's ,,	0 0 10½	...	—
Blowpipe ,,	0 0 11½	...	—

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds	2¼d. per ft. delivered.
,, fourths	1½d. ,, ,,
21 oz. thirds	3¼d. ,, ,,
,, fourths	2½d. ,, ,,
26 oz. thirds	4¼d. ,, ,,
,, fourths	3¼d. ,, ,,
32 oz. thirds	5d. ,, ,,
,, fourths	4¼d. ,, ,,
Fluted Sheet, 15 oz.	3¼d. ,, ,,
,, 21 oz.	4¼d. ,, ,,

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

¼ Hartley's	2¼d. per ft. delivered.
⅜ ,,	2¼d. ,, ,,
½ ,,	3d. ,, ,,
Figured and Oxford Rolled "Oceanic" Glass, white ...	4d. ,, ,,
Do. ,, tinted ...	5¼d. ,, ,,

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 1 9
,, ,, ,, in barrels	,,	0 1 10
,, ,, ,, in drums	,,	0 2 0
Boiled ,, ,, in pipes	,,	0 1 11
,, ,, ,, in barrels	,,	0 2 0
,, ,, ,, in drums	,,	0 2 2
Turpentine in barrels	,,	0 3 10
,, in drums	,,	0 4 0
Genuine Ground English White Lead	per ton	23 10 0
Red Lead, Dry	,,	22 10 0
Best Linseed Oil Putty	per cwt.	0 7 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

TERMS OF SUBSCRIPTION.

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

ANSTWICK.—For sewerage and sewage disposal works (Contracts Nos. 1 and 2), for Settle Rural District Council. Mr. T. A. Foxcroft, Engineer and Surveyor, Town Hall, Settle:—

Contract No. 1.

Cumberland Bros., Bentham, Lancaster £1,822 6 10

Contract No. 2.

Cumberland Bros., Bentham, Lancaster 244 8 5

ARUNDEL.—For making-up, etc., 400 sq. yds. of Wood View-road and Ford-road, including 580 ft. Norwegian granite kerb and brick channelling, for the Town Council. Mr. E. F. Farrington, Borough Surveyor, Town Hall, Arundel. Quantities by Borough Surveyor:—

Potter Bros. ..	£245 0 0	H. W. Haggett	£216 3 7
M. Webb	240 16 0	M. Thacker & Co.	196 7 5
J. Jackson	240 5 9	E. G. Holland*	189 18 7
E. H. King	239 6 6		

BANGOR.—For erecting new free library. Messrs. Dixon & Potter, architects, 65, King-street, Manchester:—

W. Jones	£3,898 0 0	E. Thorp & Son	£3,310 0 0
E. Jones & Son	3,850 0 0	W. Osborne & J. Williams	3,230 0 0
R. & J. Williams	3,843 0 0	R. Neill & Son	3,166 0 0
Jones & Williams ..	3,575 0 0	Hughes & Stirling, Bootle, Liverpool*	2,860 0 0
H. Hughes ..	3,414 0 0		
R. Evans & Son	3,333 0 0		
W. Parry	3,314 16 0		

BARNOLDSWICK.—For street works, for the Urban District Council. Mr. W. Bennett, Town Surveyor, Town Hall, Barnoldswick:—

—	York, Wellington and Commercial streets.	Backs of Co-Op. st., Kaighall-rd., Chapel-st., Beech-st., Chapel and Part Cobden-sts.	Total.
	£ s. d.	£ s. d.	£ s. d.
T. Starkey	—	—	2,114 8 0
T. E. Sugden	—	—	1,726 11 11
J. Miles ..	—	—	1,660 11 6
W. J. J. McDonald	1,127 8 8	519 16 3	1,647 4 11
W. Baker, Keighley	1,054 5 9	490 8 6*	1,544 14 3
J. Green, Burnley	1,029 14 7*	496 7 9	1,526 2 4

CAISTOR.—For constructing and testing a new water main at Moortown, for the Rural District Council. Mr. E. J. Silcock, M.Inst.C.E., 10, Park-row, Leeds. Quantities by engineer:—

E. Tabor	£1,288 12 3	Castle & Co...	£1,225 6 0
Jenkin & Sons	1,275 0 0	T. Egan & Sons	1,211 17 0
H. Shardlow..	1,268 8 6	R. C. Crawford	1,158 0 3
Schofield & Co.	1,266 12 1	Mitchell & Son	1,108 5 0
J. K. Jones ..	1,266 4 0		
J. Totty	1,262 0 0		

CAVERSHAM.—For sewage disposal works (Contract No. 2) and manager's cottage, for the Urban District Council. Mr. A. J. Smith, Engineer and Surveyor, 11, Bridge-street, Caversham:—

Tenders for New Sewage Works.

A. G. Osenton	£13,551 16 6
Hardy, Bate, & Co.	12,548 14 6
Hewett & Sons, Ltd.	12,073 4 11
E. T. Jeffrey	11,381 14 8
W. Moss & Sons, Ltd.	10,947 13 3
T. Vale & Sons, Ltd.	10,693 11 2
H. Hill	10,259 6 7½
J. Moran & Son, Ltd.	10,170 11 3
B. Cooke & Co.	10,053 0 0
Bower Bros.	9,928 13 0
Chick & Carden	9,783 17 2
McCarthey E. Fitt‡	9,727 0 0
A. Faulks	9,665 12 9
H. W. Godwin	9,437 1 6
G. S. Lewis & Bro.	9,297 0 0
A. Streeter & Co.	9,208 3 9
Collier & Catley, Ltd., St. Mary's Butts, Reading*	8,483 1 2
H. Barris & Son	8,425 17 0
G. G. Rayner§	8,320 14 7
R. H. B. Neal, Ltd.	8,090 8 11
T. H. Macdonald	8,086 0 0

[Surveyor's estimate, £8,771 17s. 6d.]

‡ No schedule.

§ Incomplete.

Manager's Cottage.

W. Hawkins	£499 0	R. Bell & Sons ..	340 0
W. Stokes & Sons	498 15	G. Stockwell & Sons	335 0
J. Trinder & Sons	495 10	Fisher Bros.	335 0
H. A. Wyeth	455 0	Batten Bros., 219, Southampton-street, Reading*	325 0
F. W. Romain & Sons	405 12		
H. W. Godwin ..	377 0		

[Surveyor's estimate, £300.]

HACKNEY.—For the erection of a central library for the Borough Council. Mr. Henry A. Crouch, architect, 12, Gray's Inn-square, W.C.:—

—	—	Extra Cost if Ancaster Stone is substituted for Monks Park.	Total.
	£	£ s.	£ s.
C. Dearing & Sons..	12,684	318 0	13,002 0
A. F. Vigor & Co...	12,440	850 0	13,290 0
Kirk & Randall....	12,293	615 0	12,908 0
I. & M. Patrick	12,228	325 0	12,553 0
Patman & Fotheringham	12,183	320 0	12,503 0
Martin, Wells, & Co.	12,029	931 0	12,960 0
Sheffield Bros.	11,975	550 0	12,525 0
C. Wall, Ltd.....	11,970	700 0	12,670 0
C. Castle & Son....	11,950	461 10	12,411 10
F. & H. F. Higgs ..	11,885	491 0	12,376 0
Leslie & Co.	11,790	610 0	12,400 0
Perry & Co.	11,786	491 0	12,277 0
A. Fairhead & Son..	11,769	700 0	12,469 0
W. Lawrence & Son	11,674	535 0	12,209 0
E. Lawrence & Son	11,663	615 0	12,278 0
C. R. Price	11,650	595 0	12,245 0
W. J. Fryer & Co...	11,500	600 0	12,100 0
Sabey & Son	11,500	400 0	11,900 0
J. Chessum & Sons	11,467	580 0	12,047 0
H. L. Holloway ..	11,465	500 0	11,965 0
Fitch & Cox	11,180	608 0	11,788 0
B. E. Nightingale..	11,064	647 0	11,711 0
Killby & Gayford..	10,998	630 0	11,628 0
Shurmur & Sons ..	10,989	600 0	11,589 0
C. P. Roberts	10,952	276 0	11,228 0
Edwards & Melway, Kennington Steam Joinery Works, 9, Ethelred-street, Kennington Cross, S.E.	10,602	560 0	11,162 0†

HARPENDEN.—For making up Douglas-road. Mr. J. H. Leverton, surveyor:—

W. H. Worthington	£1,841 3 6	G. Powdrill..	£1,195 18 0
E. C. Jarvis..	1,320 6 0	H. Williams..	1,150 2 11
T. Adams ..	1,303 6 10	C. Killingback, Camden Town*	1,091 9 3
T. Free & Sons	1,280 9 8		

[Surveyor's estimate, £1,293 8s. 6d.]

HARROGATE.—For private street works, in back roads off York-road, for the Corporation. Mr. F. Bagshaw, Borough Engineer and Surveyor, Harrogate:—

A. Leedham, 4, Park-villas, New Park, Harrogate* £282 2 4

HEREFORD.—For taking down three old cottages, numbers 86, 87, and 88, Widemarsh-street, Hereford, and erecting three new cottages on the site. For Mr. W. Davis. Mr. H. Skyrme, architect, 138, Widemarsh-street, Hereford. Quantities by architect:—

W. P. Lewis & Co. ..	£844	E. Cooke	£735
W. Powell	739	E. Davies*	720

[All of Hereford.]

KIRKCUDBRIGHT.—For the construction of filter-beds and the providing and laying of a line of cast-iron pipes from Lochfergus to Kirkcudbright, for the Town Council. Mr. R. Miller, Borough Surveyor, Kirkcudbright:—

J. Low	£390 5 9	D. W. Kill	£319 14 6
P. Drummond & Son	333 10 0	J. Gilfeather, Dumfries* ..	303 18 9

LLANON.—For erecting new offices and other work at Council school. Mr. G. Dickens-Lewis, County Architect, Aberystwyth :—

W. Jones	£295 0	M. Davies	£208 10
T. James	249 0	D. P. Jones, Llangwryfon*	198 10
D. P. Jones	269 0		
W. Edwards	215 10		

LONDON.—For the erection of new premises in Middlesex-street, E., for Messrs. C. & H. Finegold. Mr. C. B. Hollist, architect and surveyor, 35, Jewry-street, E.C. :—

S. Lissner	£7,200 0 0	C. Sims‡	£5,565 17 6
F. W. Scott	5,950 0 0		

‡ Amended and accepted at £5,350.

LONDON.—For exterior painting and repairs to laundry roof at the Strand Union Workhouse, Upper Edmonton, for the Guardians. Mr. A. A. Kekwick, architect, Outer Temple, Strand :—

	Painting.	Repairs to roof.
A. Monk	£945	£265
T. Sharpington	908	242
Love & Co.	875	205*
W. C. Ridgway	650	—
J. Stewart	556	198
Barrett & Power	538	313
J. J. Richards	524	—
A. Porter	493	—
F. W. Harris	439	340
H. Willmot	429	—
J. Johnson	410	—
W. Moore & Son	399	—
Limmer & Galloway	302	—
Pat McCarthy	297*	—

MABLETHORPE.—For additions to the Council Schools, for Lindsey County Council Education Committee. Messrs. Scorer & Gamble, architects, Bank-street-chambers, Lincoln :—

Sprakes & Sons	£1,650 0 0	Thompson & Sons	1,323 0 0
J. Crawshaw	1,625 12 4	Halkes Bros.	1,299 0 0
F. Moore	1,485 10 0	A. J. Elmes	1,278 2 0
J. Guttridge	1,390 0 0	Mawer Bros.	1,245 0 0
Hinson & Co.	1,344 0 0	F. Scarborough, Lincoln*	1,112 16 0

NORTHAMPTON.—For widening the approaches of Irthlingborough Bridge for the County Council. Mr. C. S. Morris, County Surveyor, County Hall, Northampton :—

Smith & Son	£1,875	F. Henson	£1,555
G. J. Fisher	1,740	Sturgess & Sons	1,541
R. Marriott	1,740	E. Brown & Son	1,463
G. Henson & Son	1,600	Goodman & Murkett, Wellingborough*	1,259
Berrill & Green	1,578		
Hacksley Bros.	1,557		

NORTHAMPTON.—For rebuilding constable's house at Brackley police station, for the County Council. Mr. C. S. Morris, County Surveyor :—

G. Orchard & Son	£499	Sturgess & Sons	£368
J. S. Kimberley	460	Berrill & Green	360
J. F. Booth	435	Goodman & Murkett	360
F. G. Watson	428	G. J. Fisher	350
W. H. & T. Hawkins	400	Goy & Co.	330
R. Cosford	388	H. Holloway, Northampton*	325
R. Marriott	385		

PENRITH.—For building river walls and constructing steel girder bridge across river Eamont (Sewerage Works, Contract 3), for the Urban District Council. Mr. J. G. Knewstubb, Resident Engineer, Town Hall, Penrith. Quantities by Messrs. Brierley, Holt, & Co., engineers, Blackburn :—

W. Grisenthwaite	£2,005 0 0
B. Firth	1,702 16 10
J. Jackson & Son, Penrith*	1,618 18 1
Mackay & Sons	1,597 18 0

STANSTED (Essex).—For the extension of sewers, for the Rural District Council. Mr. E. T. Watts, Surveyor, Thorley, Bishop's Stortford,—

J. J. Quarterman	£2,811 0 0	W. & C. French, Buckhurst Hill*	£1,280 0 0
C. Wall	2,748 0 0	G. G. Rayner	1,250 0 0
Napier & Sons	2,125 0 0	Wilson, Border, & Co.	1,179 0 0
G. Bell & Sons	1,485 0 0	J. Jackson	1,123 0 0
F. C. Thompson	1,437 16 7	Flack & Sons	1,120 8 3
Langley & Johnson	1,421 9 3	W. Johnson	970 0 0
T. Free & Sons	1,321 0 0		
A. Wooldridge	1,311 8 3		

SANDOWN.—For alterations and additions to the Town Hall, for the Urban District Council. Mr. L. G. Dashper, Surveyor to the Council. Quantities by Surveyor :—

J. White	£350 0	W. J. Payne, Sandown*	£265 0
Ball & Sons	319 0		
H. A. Hull	295 10		

STRETFORD.—For the erection of twenty pairs of semi-detached cottages in Lacy-street, Stretford, near Manchester, for the Stretford Urban District Council. Messrs. John Bowden & Co., architects, 14, Ridgefield, Manchester :—

Howard & Son	£7,450 0 0	M. Stone & Sons	£6,290 0 0
A. Spittal	7,409 0 0	R. Carlyle	6,287 0 0
J. Caldwell	7,154 0 0	W. Thorpe	6,237 0 0
S. Warburton	7,006 5 7	W. Watson	6,229 10 0
J. & J. Parish	6,912 2 0	T. Mitchell	6,140 0 0
G. W. Dawson	6,885 0 0	T. Williams & Sons	6,120 0 0
H. Vickers & Son	6,730 0 0	J. Gerrard & Sons, Ltd.	6,113 0 0
Fearnley & Sons	6,712 0 0	F. Cain, Stretford*	6,100 0 0
A. Hodkinson	6,610 0 0		
E. Powell	6,365 0 0		

SWINDON.—For erecting schoolroom, Upper Stratton, for Primitive Methodist Trustees. Mr. J. Hyde, 12, Lichfield-grove, Church End, Finchley, London, N. :—

W. Tarrant	£625 0 0	R. Leighfield	£496 0 0
J. Kilminster	553 17 6	A. Colbourne, County-road, Swindon*	425 3 8
W. Harding	504 0 0		

TARLAND (N.B.).—For rebuilding shops and bakehouse, for the trustees of the late Charles Grant. Mr. W. E. Gauld, A.R.I.B.A., 258, Union-street, Aberdeen. Quantities by the architect :—

Mason: G. Duncan, Inverurie	£119 9 0
Carpenters: Stalker & Craigen, Aberdeen	180 10 0
Slaters: R. Wright & Son, Aboyne	49 9 7
Plumber: W. Reid, Banchory	27 0 0
Painters and Glaziers: J. Mason & Son, Aberdeen	45 13 6

WESTON-SUPER-MARE. — Milton new infants' Council school. Messrs. Hans Price & W. Jane, architects, Weston-super-Mare :—

H. A. Forse & Sons	£2,440 0	C. Addicott	£2,110 0
A. G. Heard	2,360 0	G. Sprake	2,049 0
E. Preece	2,277 0	A. J. Colborne	2,029 12
G. Pollard & Co., Ltd.	2,148 0	H. J. Fear & Sons	1,830 0
C. Taylor	2,142 0	H. W. Pollard, Bridgwater*	1,749 0

YORK.—For extending the destructor buildings, Fors Island Depot, for the Corporation. Mr. A. Creer, Architect, Guildhall, York :—

F. Shepherd & Co., Lead Mill-lane, York* £793

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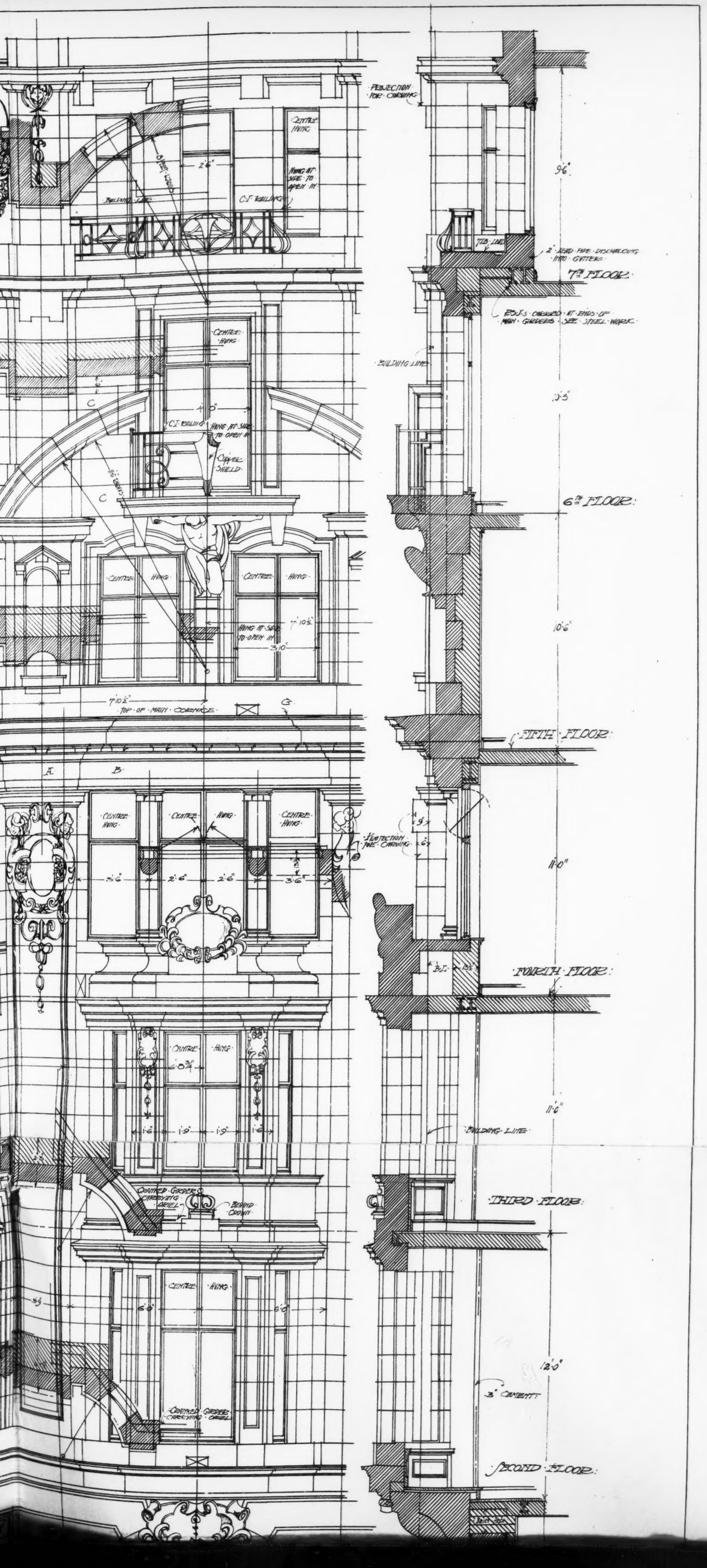
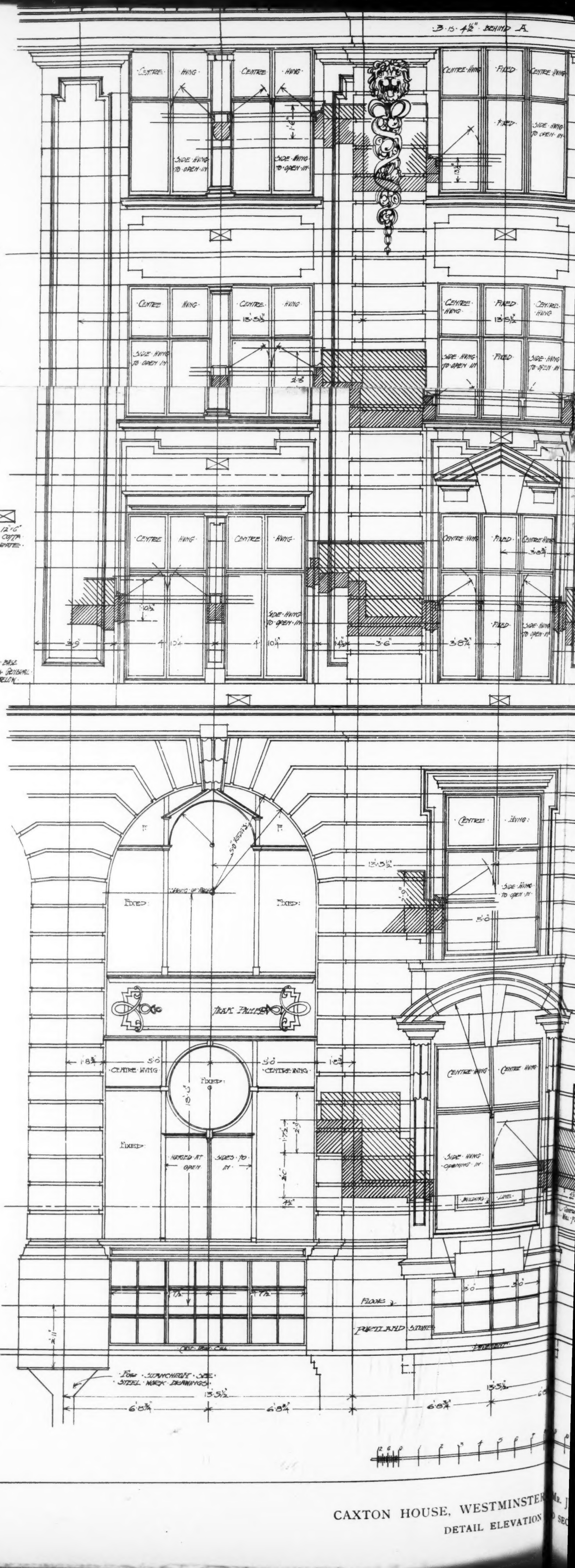
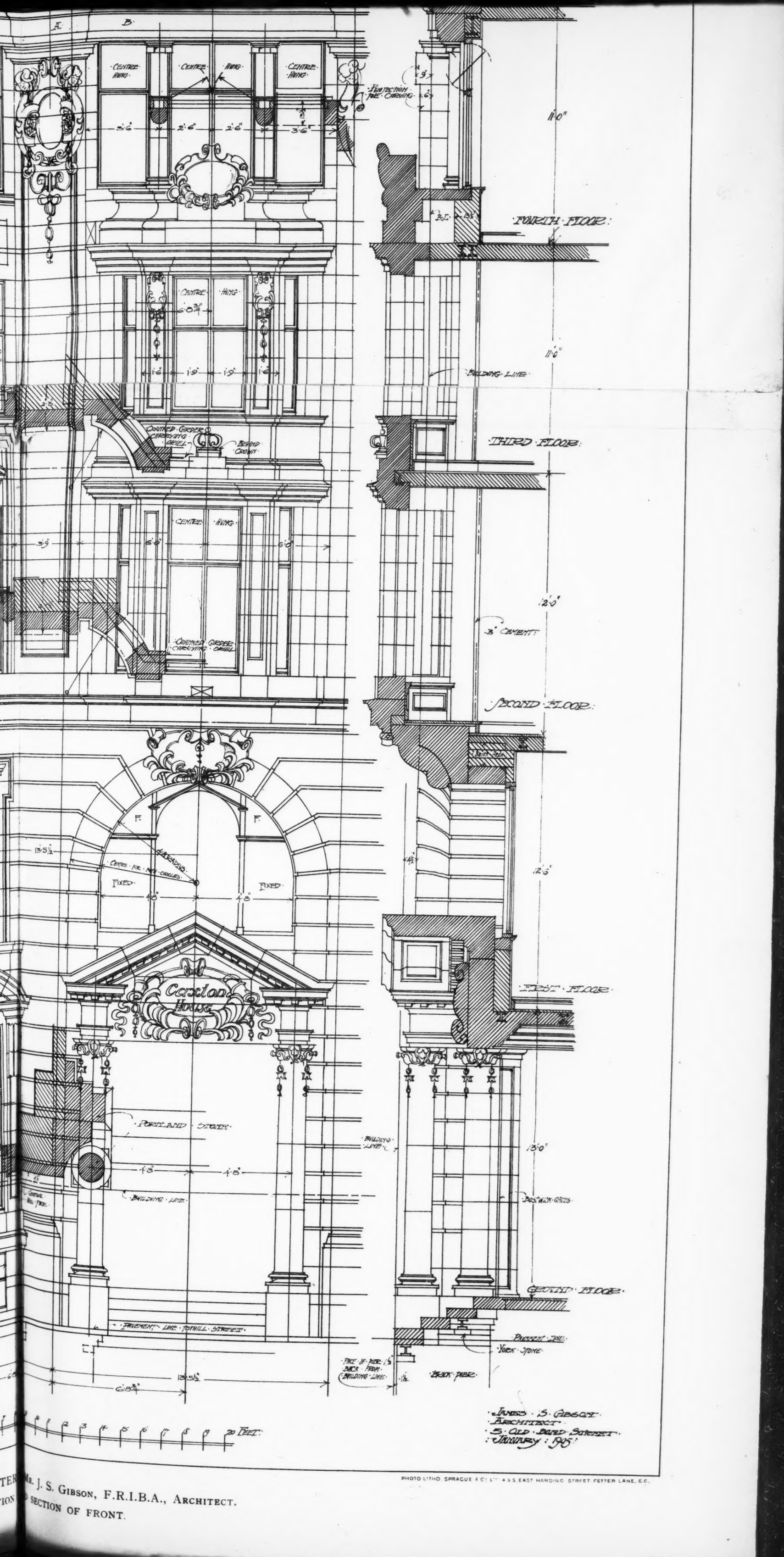
CENTRE
HUNG
HUNG AT SIDE TO OPEN IN
7 lb. LEAD COVERING
GREEN SLATES
BUILDING LINE
14"
Note: THIS PIECE IS SAME AS GENERAL WALL PIECE BELOW
10¾"
9"
C
E IS 4½" BEHIND G
5'7¼"
B IS 4½" BEHIND A
FIXED
13'5½"
2'8"
SILLS 12"x6" TERRA COTTA ARE GREATER
10½"
3'9"
4'10½"
4'10¼"
3'6"
3'8¾"
Note: THIS BASE SAME LINE AS GENERAL WALL LINE BELOW


CENTRE HUNG
HUNG AT SIDE TO OPEN IN
2'6"
BUILDING LINE
C.I. RAILING
CENTRE HUNG
C.I. RAILING
HUNG AT SIDE TO OPEN IN
CORBEL SHIELD
CENTRE HUNG
CENTRE HUNG
HUNG AT SIDE TO OPEN IN
7'10½"
3'10"
7'10½"
TOP OF MAIN CORNICE
A
B
CENTRE HUNG
CENTRE HUNG
CENTRE HUNG
3'6"
2'6"
2'6"
3'6"
CENTRE HUNG
6'0¾"
1'6"
1'9"
1'9"
1'6"
CORNER GIRDER CARRYING ORIEL
BEHIND CORNICE
CENTRE HUNG
6'0"
6'0"
CORNER GIRDER CARRYING ORIEL
PROJECTION FOR CARVING
9'6"
7/8" LEAD
2" LEAD PIPE DISCHARGING INTO GUTTER
7TH FLOOR
BOLTS CHEVRED AT ENDS OF MAIN GIRDERS SEE STEEL WORK
BUILDING LINE
10'5"
6TH FLOOR
10'6"
FIFTH FLOOR
9"
PROJECTION FOR CARVING 6"
11'0"
B.I. 15½"
FOURTH FLOOR
11'6"
BUILDING LINE
THIRD FLOOR
12'0"
3" CEMENT
SECOND FLOOR



CAXTON HOUSE, WESTMINSTER

DETAIL ELEVATION



Mr. J. S. Gibson, F.R.I.B.A., Architect.

Section of Front.

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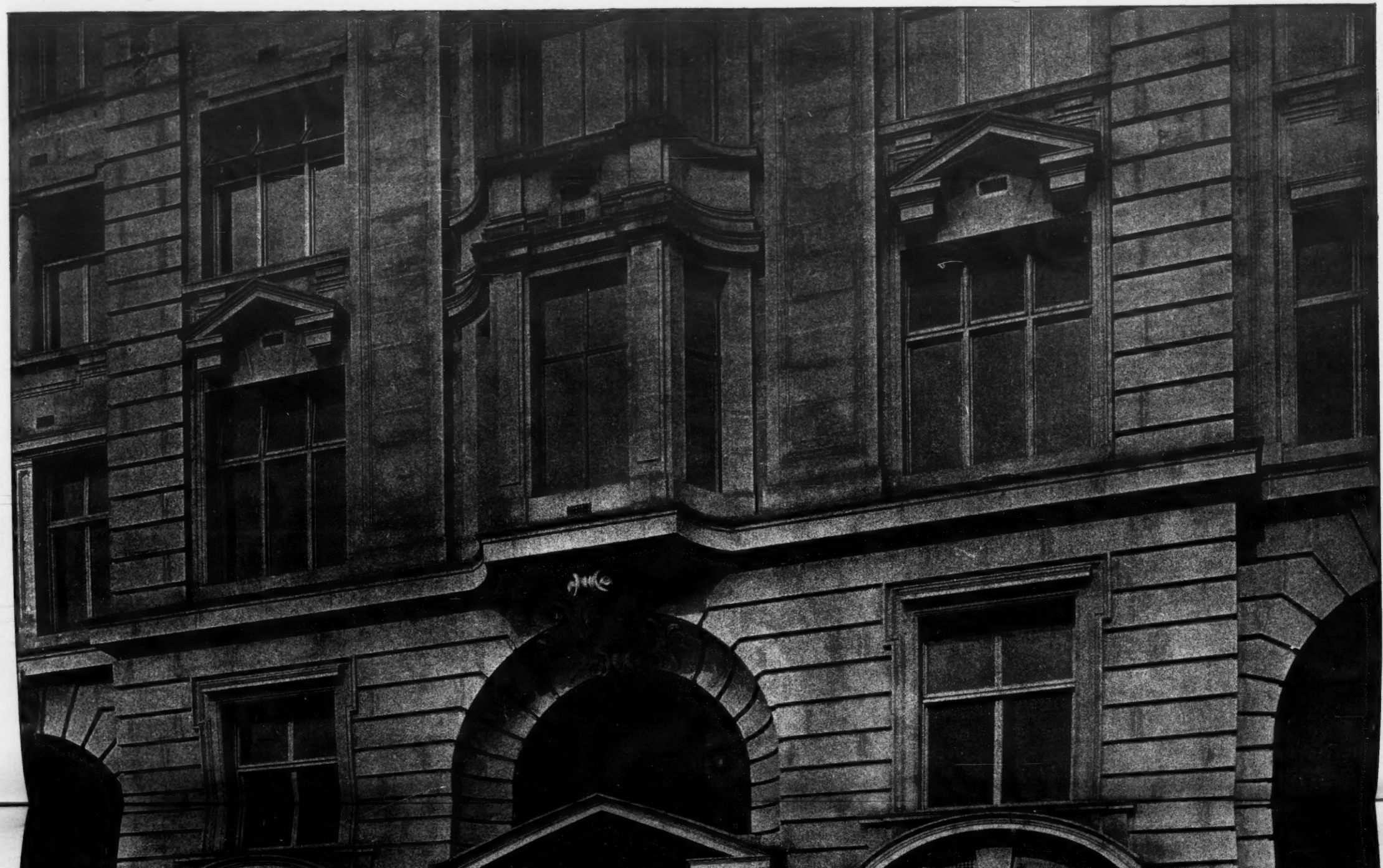

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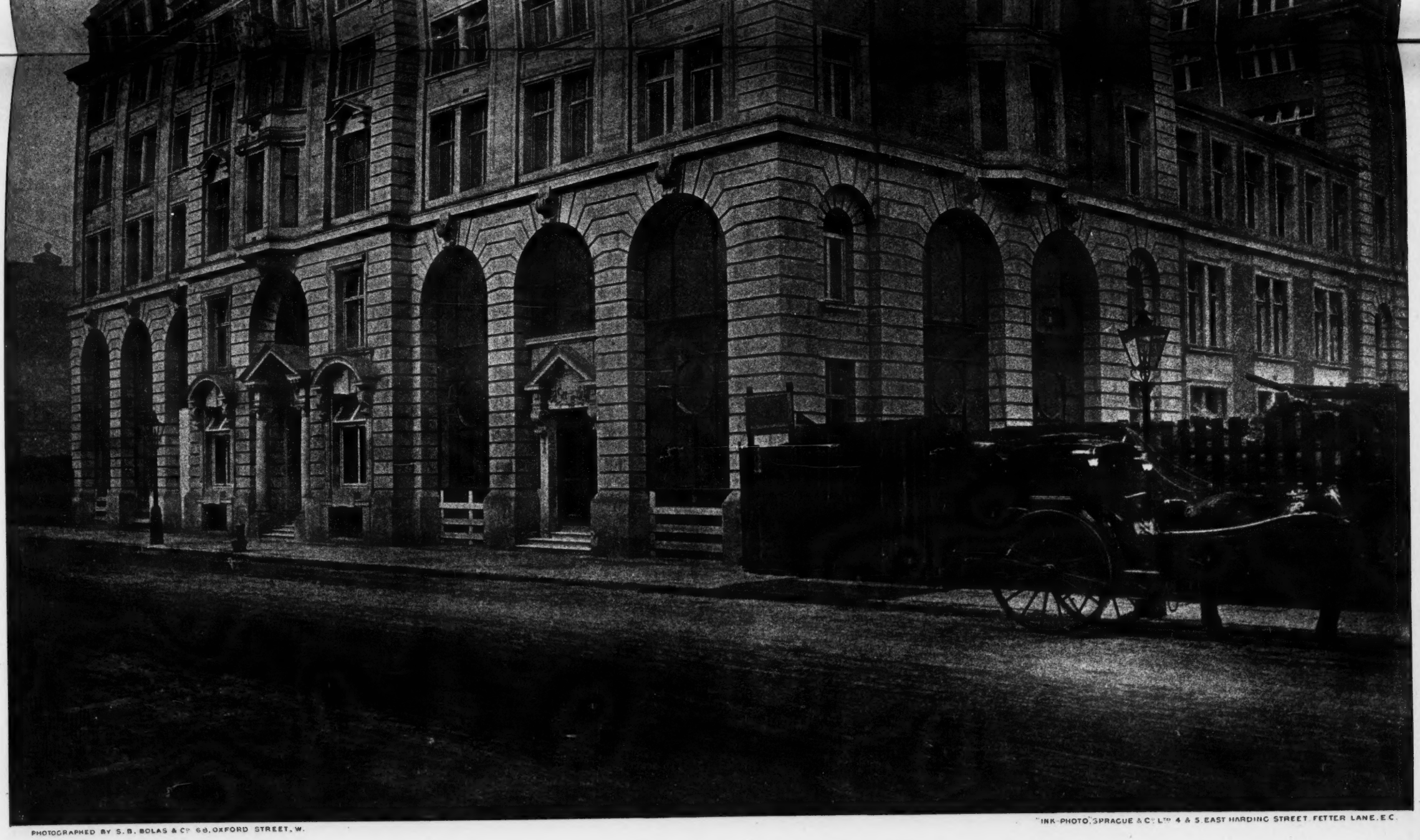
CAXTON HOUSE, WESTMINSTER.—Mr. J. S. Gibson, F.R.I.B.A., Architect.

CENTRE PORTION OF FRONT TO TOTHILL STREET.

CAXTON HOUSE



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GENERAL VIEW.